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JOURNAL

OF THE

ASIATIC SOCIETY.

APRIL, 1849.

On the Snow-line in the Himálaya ; by Lieut. R. STRACHEY, Engineers. Communicated by order of the HON'BLE THE LIEUT.-GOVERNOR, North Western Provinces.

The height at which perpetual snow is found at different parts of the earth's surface, has become an object of enquiry, not only as a mere physical fact, but as a phenomenon intimately connected with the distribution of heat on the globe. In M. Humboldt's efforts to throw the light of his knowledge on this question, he has, when treating of the Himálaya, been unfortunately led much astray by the very authorities on whom he placed most reliance ; and his conclusions, though in part correct, cannot lay claim to any pretension to exactness. That he was indeed himself conscious of the deficiencies in the evidence before him, is manifest from his ending his disquisition by a declaration, that it was necessary, "de rectifier de nouveau et par des mesures bien précises dont tout le détail hypsométrique soit publié, ce qui reste de douteux sur la hauteur comparative des deux pentes de l' Himálaya, sur l' influence de réverbération du plateau tibétain, et sur celle que l'on suppose au courant ascendant de l'air chaud des plaines de l'Inde. C'est un travail à recommencer" (*Asie Centrale*, T. 3, p. 325). Men of science will still long have to regret that this illustrious traveller was prevented from visiting the east ; Englishmen alone need remember that he was prevented by them.

The result of M. Humboldt's investigations on the position of the snow line in this part of the Himálaya is thus given by himself :—"The

limit of perpetual snow on the southern declivity of the Himalaya chain is 2030 toises (13,000* feet English) above the level of the sea ; on the northern declivity, or rather on the peaks which rise above the Tartarian plateau, this limit is 2600 toises (16,600 ft.), from $30\frac{1}{2}$ to 32° of Latitude, while under the equator in the Andes of Quito it is 2470 toises (15,800 ft.). I have deduced this result from the collection and combination of many data furnished by Webb, Gerard, Herbert, and Moorcroft. The greater elevation to which the snow line recedes on the Thibetian declivity is the result conjointly of the radiation of heat from the neighbouring elevated plains, the serenity of the sky, and the infrequent formation of snow in very cold and dry air" (*Cosmos. Trans.* T. 1. p. 363. *Note 5*).

The portion of the *Himálaya* to which allusion has most generally been made, in treating of the snow line, is that which lies between the north-western frontier of Nipál and the river Sutlej, and it is solely to this part of the chain that my remarks are intended to apply. It extends from about the 77th to the 81st degree of east longitude, and its entire breadth, from the plains of India on the south, to the plains of Tibet on the north, is about 120 miles. The mountains on which perpetual snow is found, are confined within a belt of about 35 miles in width, running along the northern boundary of the chain, and they all lie between the 30th and 32nd degree of north latitude.

If we now examine the structure of the mountains more closely (vide sheets 47, 48, 65, and 66 of the Indian Atlas), we shall find that from the sources of the Touse, (Long. $78^{\circ} 30'$), to those of the Káli (Long. $81^{\circ} 0'$), a space which includes the provinces of Garhwál and Kumaon, all the great rivers, viz. the Bhágirati, Vishnú-ganga, Dauli (of Niti), Gori, Dauli (of Darma) and Káli, run in directions not far from perpendicular to the general direction of the *Himálaya*. Further, that they are separated one from another by great transverse ranges, on which all the highest of the measured peaks of this region are to be found. It will also be seen that the sources of these rivers† are in the main watershed of the chain, beyond which a declivity of a few miles leads directly

* The reduction of toises into English feet is every where given to the nearest hundred only.

† I mean the most distant sources of the tributaries, for several of the rivers that I have mentioned, *nominally* end in glaciers to the south of the water-shed.

to the plains of Tibet. A line drawn through the great peaks will be almost parallel to the water-shed, but about 30 miles to the south of it.

To the west of the Touse the arrangement of the drainage is very different. From the source of this river an unbroken ridge extends to the Sutlej, almost on the prolongation of the line of the great eastern peaks, but more nearly east and west. On this range, which separates Kunáwar from the more southern parts of Bissehir, and which, as it has hitherto received no distinctive name, I shall call the Bissehir range, are the Rúpin, Gunás, Burendo and Shátúl passes; and no perpetual snow is to be found further south among these western mountains. To the north of this range and almost parallel to it, run several others of somewhat greater altitude, between which the streams of eastern Kunáwar flow into the Sutlej, from S. E. to N. W., nearly parallel to the upper, and perpendicular to the lower part of the course of that river.

If we now follow two travellers into Tibet, one from Kumaon or Garhwál, and the other from Simla or the western hills, we shall be prepared to find that the circumstances under which they will cross the snowy mountains will be very different. The former will proceed up the course of one of the great rivers before alluded to, and ascending the gorge, by which it breaks through the line of the great peaks, will pass unobserved the true southern limit of the perpetual snow; he will leave the great peaks themselves far behind him, and will finally reach the water-shed of the chain, where he may possibly for the first time find glaciers and snow. He will here cross straight into Tibet, from what will appear to him the *southern*, to what he will call the *northern declivity* of the *Himálaya*.*

The western traveller, on the other hand, will find almost at his first step a snowy barrier drawn across his path, and he will naturally suppose that he crosses from the southern to the northern face of the snowy range, when he descends from the Shátúl or some neighbouring pass into the valley of Kunáwar; and in this idea he will probably be confirmed, by the total change of climate which he will perceive, and by his being able to penetrate to Shipke, the frontier village of Tibet in this quarter,

* This does not exactly apply to the passes usually crossed between Juhár and Tibet, which will be mentioned more particularly hereafter. There is a pass however, the 'Lashar,' though from its badness it is not used, which affords a direct communication.

without meeting any further obstacle on his road at all comparable to that he has passed, or perhaps even without again crossing snow.*

Without waiting to enquire whether either of our travellers has in fact come to a just conclusion, it will be sufficient for my purpose to point out that they mean totally different things by their north and south declivities; and it will be indeed surprising if they agree as to the position of the snow line. It is manifest therefore that before we can expect to arrive at any correct results, we must get rid of the confusion caused by the ambiguity of the terms *north* and *south declivity*; terms which at the best are very ill adapted to convey definite ideas of position in so vast and complicated a mass of mountains. In spite of every care, they will constantly be liable to misconception, as must always be the case where a restricted signification is arbitrarily applied, in a discussion of this sort, to expressions which of themselves have an extended general meaning.†

As a substitute for the *declivities* then, the best standard that occurs to me, to which to refer when alluding to the elevation of the snow-line at any place, is the general mass of perpetual snow found on the more elevated parts of the Himálaya, *the belt of perpetual snow*, which as I before stated, is about 35 miles in breadth, and runs along the northern boundary of the chain. Instead of the height of the snow-line *on the northern or southern declivity*, I shall therefore say, the height *at the northern or southern limit of the belt of perpetual snow*, where *the limits of the belt of perpetual snow*, are to be understood as having exactly the same relation to the snowy surface in a *horizontal plane*, that *the snow-line* has in a *vertical*.

It remains for me to define clearly what is meant by *the snow-line*, and I cannot do better than adopt the words of M. Humboldt, who says, "the lower limit of perpetual snow in a given latitude is the boundary line of the snow which resists the effect of summer; it is the highest elevation to which the snow-line recedes in the course of the whole year. We must distinguish between the limit thus defined, and three other phenomena; viz. the annual fluctuation of the snow-line; the phenomenon of sporadic falls of snow, and the existence of glaciers" (*Cosmos. Trans. T. 1. p. 327*).

* The ordinary route lies up the bank of the Sutlej.

† As a specimen, vide Capt. Hutton's papers noticed hereafter.

Having disposed of these preliminaries, which are essential to the proper apprehension of the subject, I shall proceed to examine the data from which the elevation of the snow-line is to be determined. In doing this it will I think be more convenient for me, both for the northern and southern limits, to explain first my own views, and afterwards to follow M. Humboldt's authorities, and point out the errors into which they have fallen.

1. *Southern limit of the belt of perpetual snow.*—In this part of the *Himálaya* it is not, on an average of years, till the beginning of December, that the snow-line appears decidedly to descend for the winter. After the end of September indeed, when the rains are quite over, light falls of snow are not of very uncommon occurrence on the higher mountains even down to 12,000 feet; but their effects usually disappear very quickly, often in a few hours. The latter part of October, the whole of November, and the beginning of December, are here generally characterised by the beautiful serenity of the sky; and it is at this season, on the southern edge of the belt, that the line of perpetual snow is seen to attain its greatest elevation.

The following are the results of trigonometrical measurements of the elevation of the inferior edge of snow on spurs of the *Tresúl* and *Nanda-devi* groups of peaks, made before the winter snow had begun in November, 1848.*

Point observed.	Height as observed on face exposed to the East.			Height on face exposed to West observed from Almorah.
	From Almorah, (height 5586 ft.)	From Binsar, (height 7969 ft.)	Mean.	
No. 1.	16,599 feet.	16,767 feet.	16,683 feet.	15,872 feet.
2.	16,969	17,005	16,987	
3.	17,186	17,185	17,185	14,878
4.	15,293	15,361	15,327	

* These measurements make no pretension to accuracy, but are sufficiently good approximations for the purpose for which they are intended. The heights are given as calculated from observations made both at Almora and Binsar, to show in some degree what confidence may be attached to them. The heights of Almora and Binsar are, on the authority of Capt. Webb's survey; the distance of these places, which is used as the base from which to calculate the several distances of the points observed, was got from a map of trigonometrically determined stations obtained from the Surveyor General's office.

The points 1, 2, and 3, are on ridges that run from the peaks Nos. 11 and 12, in a S. Westerly direction. The dip of the strata being to the N. East, the faces exposed to view from the south are for the most part very abrupt, and snow never accumulates on them to any great extent. This in some measure will account for the height to which the snow is seen to have receded on the eastern exposures, that is upwards of 17,000 feet. On the western exposures the ground is less steep, and the snow is seen to have been observed at a considerably less elevation; but it was in very small quantities, and had probably fallen lately, so that I am inclined to think that its height, viz. about 15,000 feet, rather indicates the elevation below which the light autumnal falls of snow were incapable of lying, than that of the inferior edge of the perpetual snow. It is further to be understood, that below this level of 15,000 feet, the mountains were *absolutely without snow*, excepting those small isolated patches that are seen in ravines, or at the head of glaciers, which of course do not affect such calculations as these. On the whole therefore I consider that the height of the snow-line on the more prominent points of the southern edge of the belt, may be fairly reckoned at 16,000 feet *at the very least*.

The point No. 4 was selected as being in a much more retired position than the others. It is situated not far from the head of the Pindur river, and lies between the peaks Nos. 14 and 15. It was quite free from snow at 15,300 feet, and I shall therefore consider 15,000 feet as the elevation of the snow-line in the re-entering angles of the chain.

I conclude then, that 15,500 feet, the mean of the heights at the most and least prominent points, should be assigned as the mean elevation of the snow-line at the southern limit of the belt of perpetual snow in Kumaon, and I conceive that whatever error there may be in this estimate, will be found to lie on the side of diminution rather than of exaggeration.

This result appears to accord well with what has been observed on the Bisschir range. The account given by Dr. Gerard of his visit to the Shátúl pass on this range, which he undertook expressly for the purpose of determining the height of the snow-line, contains the only definite information as to the limit of perpetual snow at the southern edge of the belt, that is to be found in the whole of the published writings of the Gerards; and the following is a short abstract of his obser-

vations. Dr. Gerard reached the summit of the Shátúl pass, the elevation of which is 15,500 feet, on the 9th August 1822, and remained there till the 15th of the same month. He found the southern slope of the range generally free from snow, and he states that it is sometimes left without any whatever. On the top of the pass itself there was no snow; but on the northern slope of the mountain it lay as far down as about 14,000 feet. On his arrival rain was falling, and out of the four days of his stay on the pass, it either rained or snowed for the greater part of three. The fresh snow that fell during this time did not lie below 16,000 feet, and some of the more precipitous rocks remained clear even up to 17,000 feet.*

The conclusion to which Dr. Gerard comes from these facts is, that the snow-line on the southern face of the Bissehir range is at 15,000 feet above the sea. But I should myself be more inclined from his account to consider that 15,500 feet was nearer the truth; and in this view I am confirmed by verbal accounts of the state of the passes on this range, which I have obtained from persons of my acquaintance, who have crossed them somewhat later in the year. The difference however is after all trifling.

Such is the direct evidence that can be offered on the height of the snow line at the southern limit of the belt of perpetual snow, some additional light may however be thrown on the subject generally, by my shortly explaining the state in which I have found the higher parts of the mountains, at the different seasons during which I have visited them.

In the beginning of May, on the mountains to the east of the Rám-ganga^a river, near Námik, I found the ground on the summit of the

* *Tours in the Himalaya*, T. I. pp. 289-347. M. Humboldt apparently interprets Dr. Gerard a little too literally, when, with reference to Dr. G.'s statement, that "Hans Bussun," a peak said to be 17,500 feet high, "had lost all its snow" and looked "quite black and dreary," he asks, "Quelle peut être la cause d'un phénomène local si extraordinaire?" (*Asie Centrale*, T. 3. p. 318, note.) The extreme summit of the peak of Nandádevi, which appears to be a perfect precipice for several thousand feet, is often in much the same predicament of 'black and dreary,' and many people are disappointed with its appearance for this reason, contrasting it with the beautiful pyramidal peak of No. 19 of Páñch-chúli, which is always entirely covered with the purest snow.

ridge called Champwá, not only perfectly free from snow at an elevation of 12,000 feet, but covered with flowers, in some places golden with *Caltha* and *Ranunculus polypetalus*, in others purple with *Primulus*. The snow had in fact already receded to upwards of 12,500 feet, beyond which even a few little *Gentians* proclaimed the advent of spring.

Towards the end of the same month, at the head of the Pindur, near the glacier from which that river rises, an open spot on which I could pitch my tent could not be found above 12,000 feet. But here the accumulation of snow, which was considerable in all ravines even below 11,000 feet, is manifestly the result of avalanches and drift. The surface of the glacier, clear ice as well as moraines, was quite free from snow up to nearly 13,000 feet; but the effect of the more retired position of the place in retarding the melting of the snow, was manifest from the less advanced state of the vegetation. During my stay at Pinduri the weather was very bad, and several inches of snow fell; but excepting where it had fallen on the old snow, it all melted off again in a few hours, even without the assistance of the sun's direct rays. On the glacier at 13,000 feet it had all disappeared 12 hours after it fell.

On revisiting Pinduri about the middle of October, the change that had taken place was very striking. Now not a sign of snow was to be seen on any part of the road up to the very head of the glacier. A luxuriant vegetation had sprung up, but had already almost entirely perished, and its remains covered the ground as far as I went. From this elevation, about 13,000 feet, evident signs of vegetation could be seen to extend far up the less precipitous mountains. The place is not one at which the height of the perpetual snow can be easily estimated, for on all sides are glaciers, and the vast accumulations of snow* from which they are supplied, and these cannot always be readily distinguished from snow in situ; but as far as I could judge, those places which might be considered as offering a fair criterion were free from snow up to 15,000 or even 16,000 feet.

Towards the end of August I crossed the Barjikáng pass, between Rálam and Juhár, the elevation of which is about 15,300 feet.* There was here no vestige of snow on the ascent to the pass from the south-

* This pass is so far within the belt of perpetual snow that it cannot be held to afford any just arguments as to the position of the snow line on the extreme southern edge of the belt.

east, and only a very small patch remained on the north-western face. The view of the continuation of the ridge in a southerly direction was cut off by a prominent point, but no snow lay on that side within 500 feet of the pass; while to the north I estimated that there was no snow in considerable quantity within 1500 feet or more, that is nearly up to 17,000 feet. The vegetation on the very summit of the pass was far from scanty, though it had already begun to break up into tufts, and had lost that character of continuity which it had maintained to within a height of 500 or 600 feet. Species of *Potentilla*, *Sedum*, *Saxifraga*, *Corydalis*, *Aconitum*, *Delphinium*, *Thalictrum*, *Ranunculus*, *Saussurea*, *Gentiana*, *Pedicularis*, *Primula*, *Rheum* and *Polygonum*, all evidently flourishing in a congenial climate, showed that the limits of vegetation and region of perpetual snow were still far distant.

In addition to these facts it may not be out of place to mention, that there are two mountains visible from Almora, Rigoli-gúdri in Garhwál, between the Kailganga and Nandákni, and Chipulá in Kumaon, between the Gori and Dauli (of Dárma), both upwards of 13,000 feet in elevation, from the summits of which the snow disappears long before the end of the summer months, and which do not usually again become covered for the winter till late in December.

The authorities cited by M. Humboldt in his *Asie Centrale*, give the following heights to the snow-line on the southern slope of the *Himálaya*.*

	<i>Toises.</i>	<i>English feet.</i>
Webb,	1954,	or 12,500
Colebrooke,	2032	— 13,000
Hodgson,	2110	— 13,500
A. Gerard,	2080	— 13,300
Jacquemont,	1800	— 11,500

Webb, Colebrooke, Hodgson. Immediately before the list of heights just given, M. Humboldt quotes the following part of a letter from Mr. Colebrooke: "There is a paper of mine in the *Journal of the Royal Institution* for 1819 (Vol. 17, No. 13) on the limit of snow. I deduced from the materials which I had that the limit of constant

* *Asie Centrale*, T. 3. p. 295. I take no account of the height assigned by M. M. Hügel and Vigne, as they do not refer to the region to which I confine myself.

congelation was 13,000 feet in the parallel of 31° . according to Capt. Hodgson's information, and 13,500 feet at Lat. 30° . according to Capt. Webb's."* I am unable to refer to the paper here alluded to, but a number of the *Quarterly Journal of Science* (T. 6, No. 11, pp. 51—57), has come into my hands, in which is a paper entitled "height of the Himálaya mountains," signed H. T. C., and evidently written by Mr. Colebroke. From this I extract the following sentences: "The limit of congelation is specified by him (Capt. Webb), where he states the elevation of the spot at which the Gori river emerges from the snow, viz. 11,543 feet. This observation it may be right to remark is consonant enough to theory which would assign 11,400 for the boundary of congelation in Lat. $30^{\circ} 25'$." Now as Mr. Colebroke was not an original observer, the way in which he talks of the limit of snow and then of the limit of congelation, using them as synonymous terms, would, independently of any other error into which he may have fallen, afford strong grounds for our supposing that he had no very precise ideas as to the meaning of the expression, limit of snow. But all doubt on the subject ceases, when we learn that 'the spot at which the Gori river emerges from the snow,' is neither more nor less than the extremity of an immense glacier; and when we see, as I have done, that at an elevation not 150 feet less great, and within a mile of this spot said to be at the limit of constant congelation, is situated Milam, one of the largest villages in Kumaon, where crops of wheat, barley, buckwheat, and mustard are regularly ripened every year; and that no snow is to be found in the neighbourhood in August or September at an elevation of at least 16,000† feet or 4,500 feet above the spot alluded to; it is evident that Mr. Colebrooke either used the term limit of snow in a sense very different from that now applied to it, or has been left altogether in the dark, as to those facts on which alone an opinion of any value could be formed.

I am without any means of discovering whether Capts. Webb or Hodgson ever published any distinct opinions as to the height of the snow-line, but it appears probable that the information to which Mr. Cole-

* The numbers in M. Humboldt's list do not agree with this; they have possibly been transposed by accident.

† I say 16,000 feet, as up to that height I am certain, but 18,000 is more probably the truth.

brooke alludes is simply their record of the heights of places. At all events however their evidence must be considered of little value, as they neither of them knew what a glacier was. Capt. Webb, as we have seen, talks of the Gori emerging from the snow, when we know that in reality it rises from a glacier. Capt. Hodgson falls into a similar error in his description of the source of the Ganges, (*vide Asiatic Researches*, T. 14, pp. 114—117). He says “the Bhagirati or Ganges issues from under a very low arch at the foot of the grand snow bed,” and from the almost exact coincidence of the heights it is plain that this is his limit of snow. There is not however the slightest doubt that the low arch was merely the terminal cave of a glacier, and that it was far below the lower limit of perpetual snow, though when Capt. Hodgson was there in the spring the place was probably snowy enough.

A. Gerard. I have not the means of reference to the passage quoted by M. Humboldt in support of the height given by Capt. Gerard, but in the “account of Koonawur,” which may be presumed to shew Capt. Gerard’s latest views on these matters, he says:—“The limit of perpetual snow is lowest on the outer Himalaya,” (by which he means the Bissehir range), “and here the continuous snow beds exposed to the south are about 15,000 feet.”* It is not impossible that the height which M. Humboldt gives refer to some *line of perpetual congelation*, on a number of different varieties of which Capt. Gerard remarks, such as where it always freezes, freezes more than it thaws, freezes every night, or finally where the mean temperature is 32° Fahrenheit. These, however interesting in their own way, are not the *snow-line*.

Jacquemont. The height given by this traveller is fully explained by the note that M. Humboldt adds, “au nord de Cursali et de Jumnautri ou la limite des neiges est horizontalement très tranchée.”—*Jacqu: Voy. dans l’Inde*, p. 99. Now M. Jacquemont visited Jumnautri in the middle of May, when no doubt he found the snow line

* Account of Koonawar, p. 159. It appears to me possible that the Gerards, who knew as little of glaciers as Webb or Hodgson, did not fall into similar mistake in their estimate of the height of the snow-line on the Bissehir range, because there are no glaciers or none of any size on that face, owing to the small height, less than 2000 feet, that the average line of summit rises above the snow-line. This however is only conjecture, for though I am satisfied that glaciers do exist on the north face of that range, I have in vain endeavoured to come to any conclusion as to the southern face. It may be proper to add that I have never been there myself.

'très tranchée' at 11,500 feet. I have already shewn that I found the same thing myself at Pinduri, where the snow in the autumn had all disappeared up to 15,000 feet or more. If his visit had been made in January he would probably have found the snow below 8000 feet, but this is not *perpetual snow*.

These heights therefore must all be rejected; nor can it be considered at all surprising that any amount of mistake as to the height of the snow line should be made, as long as travellers cannot distinguish snow from glacier ice, or look for the boundary of perpetual snow at the beginning of the spring.

2. *Northern limit of the belt of perpetual snow*.—My own observations on the snow-line in the northern part of the chain were made in September, 1848, on my way from Milam into Hundes, viâ U̇nta-dhúra, Kyungar-ghát and Balch-dhúra, at the beginning of the month; and on the road back again viâ Lákhur-ghát at the end of the month.

Of the three passes that we crossed on our way from Milam, all of them being about 17,700 feet in elevation, the first is U̇nta-dhúra, and we saw no snow on any part of the way up to its very top, which we reached at about 4 p. m. in a very disagreeable drizzle of rain and snow. The final ascent to the pass from the south is about a thousand feet; it is very steep at the bottom and covered with fragments of black slaty limestone. The path leads up the side of a ravine, down which a small stream trickles, the ground having a generally even and rounded surface. Neither on any part of this, nor on the summit of the pass itself, which is tolerably level, were there any remains of snow whatever; the ground being worked up into deep black mud by the feet of the cattle that had been lately returning to Milam. On the ridge to the right and left there were patches of snow a few hundred feet above; and on the northern face of the pass an accumulation remained that extended about 200 feet down, apparently the effect of the drift through the gap in which the pass lies. Below this again the ground was everywhere quite free from snow. On the ascent to U̇nta-dhúra, at perhaps 17,000 feet, a few blades of grass were seen, but on the whole it may be said to have been utterly devoid of vegetation. On the north side of the pass, 3 or 400 feet below the summit, a Cruciferous plant was the first that was met with.

The Kyungar pass, which is 5 or 6 miles north of U̇nta-dhúra,

was found equally free from snow on its southern face and summit, which latter is particularly open and level. The mountains on either side were also free from snow to some height, but on the North, as on Uñta-dhúra, a large bed lay a little way down the slope, and extended to about 500 feet from the top. On this pass a Boragineous plant in flower was found above 17,000 feet; a species of *Urtica* was also got about the same altitude, and we afterwards saw it again nearly as high up on the Lákbur pass.

From the Kyungar-ghát, a considerable portion of the southern face of the Balch range, distant about 10 miles, was distinctly seen apparently quite free from snow. In our ascent to the Balch pass no snow was observed on any of the southern spurs of the range, and only one or two very small patches could be seen from the summit on the north side. The average height of the top of this range can hardly be more than 500 feet greater than that of the pass, and as a whole it certainly does not enter the region of perpetual snow. As viewed from the plains of Hundes it cannot be said to appear snowy, a few only of the peaks being tipped.

We returned to Milam viâ Chirchun. The whole of the ascent to the Lákbur pass was perfectly free from snow to the very top, i. e. 18,300 feet, and many of the neighbouring mountains were bare still higher. The next ridge on this route is Jainti-dhúra, which is passed at an elevation of 18,500 feet, but still without crossing the least portion of snow. The line of perpetual snow is however evidently near; for though the Jainti ridge was quite free, and some of the peaks near us were clear probably to upwards of 19,000 feet, yet in more sheltered situations unbroken snow could be seen considerably below us, and on the whole I think that 18,500 feet must be nearly the average height of the snow-line at this place.

M. Humboldt's list of heights for the Northern slope is as follows :

	<i>Toises.</i>	<i>English feet.</i>
Webb,	2600,	or 16,600
Moorcroft,	2900	— 18,500
A. Gerard,	3200	— 20,500
Jacquemont,	3078	— 19,700

Webb. The height given on the authority of Capt. Webb is simply that of the Niti pass, which Capt. Webb crossed without snow in

August 1819, and Moorcroft in June* and August 1811. The Niti pass is notoriously the easiest of all the Garhwál and Kumaon passes, and remains open long after those from Juhár, which I have described above, have become impracticable; and it is held to be a certain way of escape from Tibet, by the Juháris, should a fall of snow more early than usual stop their own passes, while they are to the north of the Himálaya. It may therefore be fairly concluded that the snow-line recedes considerably above the Niti pass, as it should do if my estimate of its height be correct.

Moorcroft. The passage quoted in support of this height is as follows:—"Now Mr. Moorcroft had his tent covered two inches deep (with snow) when close to Manasarowar and on the surface of the ground it lay in greater quantities; and if his elevation was 17,000 feet† we have clear evidence that the climate of the table-land, notwithstanding the increased heat from the reverberation of a bright sun, is equally as cold as in the regions of eternal snow in the Himalayan chain, although the country of the former exhibits no perpetual snow except at heights of 18,000 and 19,000 feet." (*Tours in the Himalaya*, T. 1. p. 319). The words are those of Dr. Gerard, who on his own authority thus gives 18,000 or 19,000 feet as the elevation of the snow-line in the part of Tibet near the Sutlej; and this, as far as it goes, corroborates the conclusion to which I have come.

A. Gerard. In the absence of the books to which M. Humboldt refers, I conclude that the height here given is that to which Capt. Gerard supposed the snow receded on the ridge above Nako. But this is to the North of the Sutlej, and therefore is not in the region to which I have confined myself. In the "Account of Kunawar" however the following remark that is applicable, is to be found:—"In ascending the Keoobrung pass, 18,313 feet high in July, no snow was found on the road," (p. 159). This pass is situated on the water-shed of the Himálaya about 20 miles east of the great bend in the Sutlej, and about 8 miles to the south of that river; it is on the northern limit of the belt

* Not *January*, as is erroneously printed in the 'Asie Centrale' Vide, Asiatic Researches, Vol. 12, pp. 417—494.

† The elevation of Mánasarowar, as M. Humboldt correctly conjectured, is about 15,200 feet only.

of perpetual snow, the ground between it and the Sutlej not being of sufficient height to be permanently covered with snow.

Jacquemont. The Keoobrung pass of Capt. Gerard, under a name slightly changed, is the same as that from which M. Jacquemont made his observations, "Sur le col de Kioubrong (entre les rivières de Buspa et de Shipke ou de Lang zing khampa) à 5581 mètres (18,313 feet) de hauteur selon le capitaine Gerard, je me trouvais encore de beaucoup au-dessous de la limite des neiges perpétuelles dans cette partie de l'Himalaya (lat. $31^{\circ} 35'$, long. $76^{\circ} 38'$). " Je crois pouvoir porter la hauteur des neiges permanentes dans cette région de l'Himalaya à 6000 mètres (19,700 feet,") (*Asie Centrale*, T. 3. p. 304). I will admit that M. Jacquemont's estimate of the height of the snow-line on the southern face of the range, is not such as to induce me to place implicit confidence in this either; but allowing for some little exaggeration, there can be no room for doubting that the snow-line must here recede nearly to 19,000 feet.

Whether the result at which I have arrived from what I saw on the Juhár passes be too little, or this too great, or whether there may not be in fact a difference of elevation, are matters of comparatively small importance. As I purpose to point out hereafter, the chances of error in the determination of great altitudes by single Barometrical observations are very considerable, more particularly when as is most generally the case, there is no corresponding observation within 60 or 70 miles. All of these heights are deduced from such observations, and errors of 150 or even 200 feet on either side of the truth, or differences of 300 or 400 feet, may, I am satisfied, quite easily arise in the calculations. I shall therefore continue to call the height of the snow-line at the Northern limit of the belt of perpetual snow, 18,500 feet; not that I consider my own calculation as worthy of more confidence than Capt. Gerard's, or M. Jacquemont's, but that it is, in the present state of our knowledge, sufficiently exact, and certainly not exaggerated.

As the principal object of the present enquiry is the elevation of the snow-line in the *Himálaya* I have in the foregoing observations confined myself strictly to that region of these mountains that I at first specified; but it is not the less important to notice the heights at which we find perpetual snow still further to the north. Capt. Gerard, after mentioning the Keoobrung pass, goes on to say, "In August when I

crossed Manerung pass, 18,612 feet," a pass on the range that divides Piti from Kunáwar, "there was only about a foot of snow, which was new and had fallen a few days before." "In October on the ridge above Nako," about 5 miles north of the great bend in the Sutlej, "we ascended to 19,411 feet, and the snow which was all new and no more than a few inches deep, was only met with in the last 400 or 500 feet; this was on the face of the range exposed to the west, but on the opposite side no snow was seen at almost 20,000 feet."—(p. 160). During the whole of our expedition into Hundes in September 1848, we only saw very small patches of snow in two places, on both occasions in sheltered ravines; but in the part of the country through which we passed perpetual snow is not to be looked for, the highest mountains probably not exceeding 18,000 feet in height. In the true plains of Tibet, snow would be just as difficult to find in the summer months, as in the plains of India. From my own observations made in this journey, I infer that the height of the limit of snow on the southern face of Kailás is not less than 19,500 feet; and there is nothing now on record that I know of, that indicates the latitude beyond which the snow-line again begins to descend.

From a review of the whole of the facts that have been brought forward, it may I think be considered as fully established, that M. Humboldt, though underestimating the actual elevation of the snow-line, was certainly right in what he advanced as to the relative height on the two opposite faces of the chain. The doubts that were raised by Capt. Hutton on this point in his paper entitled "Correction of the erroneous doctrine that the snow lies longer and deeper on the southern than on the northern aspect of the Himalaya," were perhaps almost sufficiently answered by Mr. Batten at the time they were first brought forward; but as I have reopened the whole question I will add a few words on this subject also.*

* Vide M'Clelland's Journal, Nos. 14, 16, 19, 21. Captain Hutton's first letter begins thus; "Previous to my trip through Kunawar in 1838, I had frequently heard it contended that the snow lay longer, deeper, and farther down on the southern exposure of the Himalaya than it was found to do on the northern aspect, you may therefore easily imagine my astonishment, when crossing the higher passes through Kunawar, Ilungrung and Pitti, I found the actual phenomena to be diametrically opposite to such a doctrine, and that the northern slopes invariably

The doctrine that Capt. Hutton attacks as erroneous, undoubtedly is so. But it is a doctrine that was never inculcated by any one.—Capt. Hutton having misunderstood the true enunciation of a proposition, reproduces it according to his own mistaken views, and then destroys the phantom that he has raised. The fact that Captain Hutton saw to be true was this, that as a general rule, snow, sporadic, as well as perpetual, will be found to lie at a lower level on the northern, than on the southern aspect on any individual range in these or any other mountains. In drawing his conclusions from this fact, the first error into which he fell was to confound the north and south aspects of *the individual ridges*, with the north and south aspects of *the chain*; and he somewhat complicates matters by neglecting to distinguish between *snow* and *perpetual snow*. These mistakes having been pointed out to him, he tried to correct them, but still could not get over the terms *north and south declivity*; for he ends by assuming that they apply to the north and south aspects of the Bissehir range, which he conceives to be ‘the true *Himálaya*, the central or main line of snowy peaks.’ Here he falls into an error of logic no less flagrant than the former; he restricts the term ‘*Himálaya*’ to this range, which may or may not be central, for that has nothing to do with the matter, and then assumes that this *Himálaya* of his own, is the *Himálaya* of whose north and south declivities we speak, when we repeat that the snow-line *is* at a greater elevation on the northern than on the southern face of the chain.*

carried more snow than the southern exposure.” (No. 14. p. 275.) In his last letter he says, “I have already acknowledged the faultiness of my first letter, in so far as regards my having omitted to state in sufficiently distinct terms, that my remarks referred to the actual northern and southern aspects of the true *Himálaya* or central or main range of snowy peaks, and not to the aspects of secondary groups and minor ranges.” This ‘true *Himálaya*’ is the Bissehir range of which I have often spoken. I say nothing of Capt. Hutton’s views regarding perpetual snow, the existence of which, as far as I can understand him, he appears to doubt.

* The word ‘*Himálaya*,’ which to the natives of these mountains means only the snowy peaks, is in the language of science applied to the whole chain, and in my opinion properly. Any division of the chain into ‘*Himálaya*,’ or snowy ranges, and ‘sub-*Himálaya*’ ranges not snowy, such as has I believe been made, appears to me objectionable, not only as unusual in the terminology of physical geography, and therefore likely to lead to confusion such as that of which we have just had a specimen; but as artificial and unnecessary. I repeat artificial, for in spite of the specious

The height to which the snow-line has been shown to recede on the southern face of the *Himálaya*, though considerably greater than had been supposed by M. Humboldt, still does not exceed what the analogy of mountains in similar latitudes in the other hemisphere might have led us to expect. In the central part of Chili, in Lat. 33° S. we find that the lower limit of perpetual snow is at 14,500 or 15,000 feet, while in Bolivia, in Lat. 18° S. it reaches 16,000, and even on some of the peaks 19,000 feet.* There is therefore no appearance of any thing unusual in the general height of the snow-line, which need induce us to suppose the existence of any extraordinary ascending current of heated air, regarding which M. Humboldt enquires. The exceedingly high temperature, surpassing that known at any other part of the earth's surface, which the air over the plains of North-Western India acquires during the summer, must of course produce a sensible effect in heating the upper strata of the atmosphere. But as far as I am enabled to form an opinion from the few facts that have come to my knowledge regarding the temperature of the higher regions in these mountains, I think there is little doubt that the same cause which produces this great temperature in the plain, that is, the direct radiation of the sun, acts immediately so powerfully in heating the surface of the mountains, and thereby raising the temperature of the air over them, and in melting the snow, that the secondary effects of the heated air that rises from the plains of India must be almost imperceptible.

From the way in which the term *north declivity* was introduced into the enunciation of the phenomenon of the greater elevation of the snow-line at the northern edge of the belt of perpetual snow, an idea naturally arose that it was observed only on the declivity immediately facing the plains of Tibet, and M. Humboldt, in the quotation I before gave from '*Cosmos*,' is careful to restrict it to the peaks which rise

appearance of the distinction it will not bear examination. The association of *mountains* into *chains* should be based upon the physical character and affinities of the mountains themselves, quite irrespective of any adventitious circumstances of snow or of vegetable and animal life. Botanical or zoological regions will almost always be found to follow closely the configurations of the earth's surface, on the accidents of which they chiefly depend; but to make the classification of the latter depend upon the former would be a manifest absurdity.

* *Asie Centrale*, T. 3, pp. 275, 277, 329.

above the Tartarian plateau. But this, as may have been inferred from what I have already said on the state of the three ranges that are crossed in succession between Milam and Tibet, is quite a mistake ; the fact being that the greater elevation is observed on the Tibetan face in common with the whole of the more northern part of the chain. From the remarks before made on the state in which I found the Barj-káng pass, it will be seen that even so near as it is to the southern limit of the belt of perpetual snow, a perceptible increase of elevation had already taken place. M. Jacquemont, as quoted by M. Humboldt, says, “ Les neiges perpetuelles descendent plus bas sur la pente méridionale de l'Himalaya, que sur les pentes septentrionales, et leur limite s'élève constamment à mesure que l' on s'éloigne vers le nord de la chaîne qui borde l'Inde.” (*Asie Centrale*, T. 3. p. 303.) With the proviso that the rise here spoken of is not regular, but more rapid as we cross the first great masses of perpetual snow, I entirely concur in M. Jacquemont's way of putting the case.

That the radiation from *the Plains of Tibet* can have nothing to do with the greater height to which the snow-line recedes *generally* in the northern part of the Himálaya, is evident, for it must be all intercepted by the outer face of the chain ; and that its effects even on this outer face are of a secondary order, seems to me sufficiently proved by the consideration, that on the Balch range, which rises immediately from those plains, what little snow is to be seen is on the Northern slope exposed to the radiation, while none whatever remains on the Southern slope, which is quite protected from it, exactly as is the case with every mountain anywhere.

It may therefore be concluded that some other influence must be in operation, the effects of which are generally felt over the whole of the more northern parts of the Himálaya, and such an influence is I conceive readily to be found, in the diminished quantity of snow that falls on the northern, as compared to the southern part of the chain.

The comparative dryness of the climate to the north of the first great mass of snowy mountains, is not now noticed for the first time ; it is indeed notorious to the inhabitants of Simla, and travellers often go into Kunáwar with the express object of avoiding the rains. Capt. Gerard thus describes the climate of the western part of the Himálaya : “ In the interior (i. e. of Kunáwar) at 9000 and 10,000 feet snow is

scarcely ever above a foot in depth, and at 12,000 it is very rarely two feet, although nearer the outer range four or five feet are usual at heights of 7000 or 8000 feet. In these last places there is rain in July, August and September, but it is not near so heavy in the lower hills. When Hindustan is deluged for three months, the upper parts of Kunáwar are refreshed by partial showers; and with the exception of the valley of the Buspa, the periodical rains do not extend further to the eastward than Long. 77°.* (*Account of Kunáwar*, p. 61). He again says relative to the most northern parts of Kunáwar and the neighbouring portion of Tibet, "With the exception of March and April, in which months there are a few showers, the uniform reports of the inhabitants represent the rest of the year to be almost perpetual sunshine, the few clouds hang about the highest mountains and a heavy fall of snow or rain is almost unknown." (*Ibid*, p. 95.).

The testimony of Capt. J. Cunningham, who passed a winter in the most northern part of Kunáwar, as to the small quantity of snow that falls, is particularly valuable. He says, "In this country a southerly wind and the sun together keep slopes with a southern exposure and 12 and 13,000 feet high, quite clear of snow, (except when it is actually snowing,) and this too towards the end of January and beginning of February, or I may say at all times." Also "here I am (*April 6th*, 1842) about 9000 or 9500 feet high, wind generally southerly, no snow whatever on southern slopes within 15 or 16,000 feet, apricot trees budding, but on northern slopes and in hollows abundance of snow."† (*M'Clelland's Calcutta Journal of Nat. History*, No. 14, pp. 281, 282).

* That the fall of snow at 7000 feet is ever 5 feet in any part of these hills may I think be doubted. The Buspa is the river that runs immediately at the foot of the north declivity of the Bissehira range; and I suppose that Capt. Gerard means, that the rains do not extend up the Sutlej beyond the point where the Buspa falls into it.

† These paragraphs are taken from extracts of letters of Capt. Cunningham, given by Capt. Hutton in support of his arguments as to snow lying lower on North than on South exposures, which accounts for the last sentence. But whatever the quantity of snow may have been on the north slopes, compare the heights here given as being clear of snow early in *April*, viz. 15,000 feet, with what I have above shown to be the limit to the South of the great peaks as late as the middle of *May* viz. 12,500 feet.

From my own experience I can also speak of the remarkable change of climate that is met with in the month of August, in passing from the south to the north of the line of great peaks, by the vallies of the Gori and Rálam rivers. A straight line joining the peaks No. 14, (Nandá-devi), and No. 18, (the northern of the Páñch-chúli cluster,) cuts the Gori a little below Tola and the Rálam river about five miles further to the east near the village of Rálam. The road up the Gori being at that season impracticable, I went up the Rálam river to Rálam and thence crossed over to the Gori by the Barji-káng pass, which is on the ridge that separates the two rivers and that terminates in the peak No. 16 (Hansá-ung). From the limit of forest to the village of Rálam, the elevation of which is about 12,000 feet, the vegetation, chiefly herbaceous, was of the most luxuriant growth and boundless variety, and the soil was saturated with moisture. On crossing the Barji-káng pass and descending to the Gori, we were immediately struck with the remarkable change in the character of the vegetation, which had already lost all its rankness. But a mile or two above the village of Tola the alteration was complete; the flora had shrunk within the most scanty limits, the bushes hardly ever deserving the name of shrub, the few herbs that were there were stunted and parched, the soil dry, and the roads quite dusty. At Melam the still closer approximation of the climate to that of Tibet, is clearly shewn by the occurrence of several plants undoubtedly Tibetan, that are not found farther to the South. Such are *Caragana versicolor*, the 'Dama' of the Bhotias, which covers the plains of Tibet; a *Clematis*, dwarf *Hippophaë*, *Lonicera*, and two or three *Potentillas*; and no doubt several others might be named.

Now although it is to the winter and not to the summer rains,* that the precipitation of snow on these mountains is to be ascribed, yet the circumstances under which the vapour is condensed appeared to be the same at both seasons. Southerly winds blow throughout the year over the Himálaya, in the winter with peculiar violence;† and whatever be

* Although it does not appear to be so well known, the winter rains of North Western India are as strictly periodical as those of the summer.

† The Southerly winds that prevail at considerable heights in the Himálaya, and in the countries to the north, are diurnal phænomena, evidently dependent on the apparent motion of the sun; and in their time of beginning of maximum and of ending, greatly resemble the hot winds of the plains of India, which have a similar origin.

the more remote cause of the periodical recurrence of the rains, there can I think be little doubt, that the proximate cause of the condensation of by far the greater portion of the snow or rain that falls on the snowy mountains, is that the current from the south is more damp or hot than the air in contact with the mountains against which it blows; a relation which holds good in the winter as well as in the summer.

Thus the air that comes up from the south, no sooner reaches the southern boundary of the belt of perpetual snow, where the mountains suddenly rise from an average of perhaps 8,000 or 10,000 feet to nearly 19,000 or 20,000, than it is deprived of a very large proportion of its moisture, which is converted into cloud, rain or snow, according to circumstances. And the current, in its progress to the north, will be incapable of carrying with it more moisture, than is allowed by the very low temperature to which the air is of necessity reduced in surmounting the snowy barrier, 19,000 or 20,000 feet in altitude, that it has to pass. Nor can any further condensation be expected at all comparable in amount to what has already taken place, as it would manifestly demand a much more than corresponding depression of temperature; and this is not at all likely to occur, for the most elevated peaks being situated near the southern limit of perpetual snow, the current on passing them will more probably meet with hotter than with colder air.

It is, I conceive, to precisely similar causes, that we should attribute the great amount of rain that is known to fall at Mahabaleshwar, on the Western ghats, at Chira-punji, in Sylhet, and generally, though the quantity is far less, along the most southern range of the Himálaya itself; and it is curious to observe that the comparative dryness of the less elevated country to leeward also holds good in these cases. In the Deccan, the country immediately to the east of the western ghats, Col. Sykes tells us, that "the rains are light, uncertain, and in all years barely sufficient for the wants of the husbandman." On the same authority we find, that while the mean fall of rain for 3 years at Poona was about 27 inches,* that at Mahabaleshwar for 1834 was no less than 302 inches.† Although I have not the exact figures to refer to, I know that the rain at Nainee Tal on the external range of the Himálaya, is about double what falls at Ahnora, not 30 miles to the north.

* British Association's 7th Report, p. 236.

† *Ibid*, 9th Report, p. 15, (Sections.) The exact amount is 302.21 inches.

It will therefore be seen that as I hold the direct action of the sun to be the primary cause of the great general height to which the snow line recedes, so I consider that the increase of the height in the northern part of the chain chiefly depends, not on any additional destructive action, but on the smaller resistance offered by a diminished quantity of snow, to destructive forces, which are not indeed constant throughout the whole breadth of the chain, but whose increase appears to have no dependence on increase of distance from the southern limit of the belt of perpetual snow. Among the more evident causes of the irregularities in the melting of the snow, may be mentioned, the powerful action of the heavy summer rain on the southern face, as compared with what falls as little more than a drizzle on the northern; the protection afforded from the radiation of the sun by the heavy clouds so frequent on the south, contrasted with the relative slight resistance of the less dense, but not uncommon clouds on the north; the differences in the temperature of the air that acts on the lower edge of the snow produced by the difference of height of the snow-line on the opposite faces of the chain; and lastly, the differences of the temperature of the air and of the amount of radiation and reflexion dependent on the differences in the state of the surface of the earth, which on the south is densely clothed with vegetation, while on the north it is almost bare.

Before concluding I will observe, that the height at which it is certain that snow will fall every year, in this region of the Himálaya, is about 6500 feet; and at an elevation of 5000 feet it will not fail more than one year out of ten. The least height to which sporadic falls of snow are known to extend, is about 2500 feet; and of such falls there are only two authentic instances on record since the British took possession of Kumaon, viz. in 1817 and 1847. Thus we see that the regular annual fluctuation of the snow line, is from 9000 to 10,500 feet, and it occasionally reaches even 13,000 feet. M. Humboldt informs us that under the equator at Quito the fluctuation is 600 Ts. (3,800 feet); that at Mexico it reaches 1350 Ts. (8,600 feet); and the greatest fluctuation that he mentions is that in the south of Spain, which amounts to 1700 Ts. (10,900 feet).*

A brief recapitulation of the principal results of this enquiry will show us, that the snow-line, or the southern edge of the belt of perpetual

* *Asie Centrale*, T. 3. p. 279.

snow in this portion of the Himálaya, is at an elevation of 15,500 feet, while on the northern edge it reaches 18,500 ft.; and that on the mountains to the north of the Sutlej, or still further, recedes even beyond 19,000 feet. The greater elevation which the snow-line attains on the northern edge of the belt of perpetual snow, is a phænomenon not confined to the Tibetan declivity alone, but extending far into the interior of the chain; and it appears to be chiefly caused by the quantity of snow that falls on the northern portion of the mountains, being much less than that which falls further to the south, along the line where the peaks covered with perpetual snow first rise above the less elevated ranges of the Himálaya.

Notes on the Languages spoken by the various tribes inhabiting the valley of Asam and its mountain confines. By WILLIAM ROBINSON, Inspector of Government Schools in Asam.

(Concluded from page 237.)

PART II.

Our subsequent remarks, according to previous division, will have reference to the second great class or group of languages. These are spoken on the southern confines of the valley, and appear, more intimately than any of those already examined, to be connected with the great Chinese Stock.

A striking peculiarity in them all is, the absence of inflections, which to the classic reader appear almost essential to the existence of human speech. That this deficiency is opposed to the formation of long and sonorous words, is certain, for it is chiefly to the numerous and varied inflections employed by the Greeks, for instance, we are to attribute their ability to produce that full and majestic volume of sound which so peculiarly distinguishes their language. But among rude and semi-barbarous tribes remarkable for their comparative taciturnity and preference of plain sense over the flowers of oratory, such deficiencies it may be supposed are unimportant; especially when we consider that among the languages of the Western nations our own comes nearest to the Chinese stock in this respect; the utmost number of variations which an English verb undergoes never exceeding seven.

The deficiency referred to, however, is made up for by the use of small particles and appendages, though more frequently by the relative position of words in the formation of sentences, which is found amply sufficient to remove all ambiguity. Indeed, we find with respect to many English verbs (the verb to *cut* for instance) that of the two hundred and sixteen verbal variations which it undergoes, position alone is found equal to the task of forming two hundred and eleven, only five being formed by the addition of terminations to the original monosyllable; namely, *cuttest*, *cuts*, *cutteth*, *cuttedst*, and *cutting*.

What the English language then effects in so great a degree by position, these languages do almost wholly thereby.

The first of the group that demands our attention is

THE KHAMTI,*

which in common with the Siamese, Burmese, Laos, Shyan and Ahom, is only a dialect of the language usually known as the Tai; a language more or less prevalent through all that wide tract of country extending from Siam to the valley of the Brahmaputra.

In a language so extensive in its use, it might be conjectured that local peculiarities would have given rise to a great diversity of dialects, so that the Khamti and Siamese, spoken at the extremities, would have presented but few links of connection. On the contrary, however, we find that the discrepancies between the two are very trifling.

Mr. Brown's investigations lead him to the conclusion, that upwards of nine-tenths of the fundamental words are the same in these two dialects, with the exception of a few slight variations in pronunciation. These variations are mostly confined to a few letters, viz. *ch*, which the northern tribes change to *ts*; *d*, for which they use *l* or *u*; *r*, which becomes *h*; and *ua* which is changed for long *o*.

Different systems of writing have been introduced to express the sounds of the different dialects of the Tai. The Khamti and Shyan alphabets are evidently derived from the Burmese; the Laos is nearly related to the Burmese, but more complete and better adapted to the wants of the language than the Shyan; while the Siamese character bears only a remote resemblance to the Burmese.

* I am indebted to the kind assistance of the Rev. N. Brown for my notes on this language.

These alphabets are here presented in a tabular form for the sake of comparison. Both in their arrangement and in the power of the particular letters they seem to coincide with the Sanskrit Alphabetic System, from which they have evidently been borrowed. To provide for the expression of the varieties of accent and intonation common to the colloquial use of these tongues, double and triple combinations of letters occur (as in Bhotia) varying in extent according to the exigencies of each particular language. In Khamti, each of these letters is varied by sixteen simple accentuations, and by thirty-six complex ones. Hence it may be supposed that this dialect approximates very closely to the delicacy of the Chinese accentuation.

The Khamti is a purely monosyllabic language, and more powerfully accented than any of the Indo-Chinese languages spoken on the Asam frontier. In some degree, indeed, it seems connected with some of the Chinese dialects, especially the Mandarin or Court language, with which its numerals, as well as a few other terms, coincide, but these are not very numerous. By its finely modulated intonations, sounds organically the same are often made to express totally different ideas. Thus, *má*, for instance (with the rising tone) signifies a *dog*; *má*, (the Italic *m* denoting the falling tone) signifies *to come*; while the same syllable, with an abrupt termination, or a sudden cessation of the voice at the end of it, *má*, denotes a *horse*.

OF NOUNS.

As inflections are unknown to the language, the accidents of Case, Mood, and Tense are expressed by means of particles, generally following, but in some cases preceding the nouns or verbs they serve to modify.

The Nominative and Accusative cases do not need the aid of particles; they are merely the nouns in their natural state.

The expression of the Genitive case, depends solely on the juxtaposition of the two substantives in which, contrary to the idiom of the Chinese, the *latter* substantive is understood to be in the genitive case. Thus; *mü*, *hand*, and *man*, *he*, when placed in juxta-position, *mü man*, signify *his hand*. *Háng*, a *tail*, and *pá*, a *fish*. *Háng pá*, a *fish's tail*.

The Dative case is sometimes denoted by a prepositive particle to mark the person receiving, or, more frequently by the position of the noun before a donative verb,—a usage by no means foreign to the English language, in which such expressions as, I sent George a book, I gave

a ball to James, are extremely eommon. The preposition *Hang* is most eommonly used as the partiele to denote the dative ease. Thus :

²Hang ³man ¹haü ¹da. ¹Give (it) ²to ³him. ³Hang ¹man ²maü ¹po. ¹You ²beat ³him.

The other Cases, denoted in Sanskrit by the names of the Instrumental, the Ablative, and the Locative, are supplied by the use of prepositive partieles.

The Khamti noun admits of no plural form. In those instaneces in which the noun does not express a eollective or a plural idea, a numeral added to it renders the expression suffieiently intelligible.

To express the difference of gender in the inferior animals, the term *Thuk*, is used to denote the *male*; and *Me*, the *female*.

A horse, Masc. Mä thuk; *Fem.* Mä me.

A deer, Masc. Nyí thuk; *Fem.* Nyí me.

A goat, Masc. Pe thuk; *Fem.* Pe me.

A tiger, Masc. Sü thuk; *Fem.* Sü me.

A dog, Masc. Má thuk; *Fem.* Má me.

A cat, Masc. Miau thuk; *Fem.* Miau me.

For individuals of the human family the term *Sáu* is used to distinguish the *male*, and *Ying*, the *female*.

Masculine.

Kun sáu, man.

Luk sáu, son.

Pi sáu, brother.

Kun sáu án, boy.

Feminine.

Kun ying, woman.

Luk ying, daughter.

Pi ying, sister.

Kun ying án, girl.

In some eases however gender is indicated by the use of distinct words. Thus; *Po, father*; *Me, mother*. *Phó, husband*; *Mé, wife*.

OF ADJECTIVES.

An adjective generally follows a substantive; *examp.* *Kun ní, a good man.*

Má ma ní, a bad (not good) dog. *Pú pi, a fat sheep.*

In forming the *comparative degree* of the adjective, the word *Leu*, *beyond, than*, is added to it in its positive form. Thus; *yaü, great*; *yaü leu hün, greater than the house.* *Kat, cold.* *Kat leu nam, colder than water.*

The *superlative degree* is formed by the addition of the words *Leu*

peun. Thus, *Noí, a mountain*; *Sung, high*; *Noi sung leu peun, a mountain higher than all, or the highest mountain.*

NUMERALS.

The Khamti numerals are the same as those used by the Siamese.

- | | | | | |
|----------|---------|---------|----------|----------|
| 1. Nŭng. | 3. Sám. | 5. Há. | 7. Tset. | 9. Kau. |
| 2. Song. | 4. Sí. | 6. Hók. | 8. Pet. | 10. Sip. |

After which the ordinals are repeated and compounded.

- | | |
|---------------|------------------|
| 11. Sip-it. | 21. Sáu-it. |
| 12. Sip-song. | 22. Sáu-song. |
| 13. Sip-sám. | 23. Sáu-sám, &c. |
| 14. Sip-sí. | 30. Sám-sip. |
| 15. Sip-há. | 40. Sí-sip. |
| 16. Sip-hók. | 50. Há-sip. |
| 17. Sip-tset. | 100. Pák. |
| 18. Sip-pet. | 1000. Heng. |
| 19. Sip-kau. | 10,000. Mùn. |
| 20. Sáu. | 1,00,000. Láp. |

Numeral affixes, or as they have sometimes been called, generic particles, are in common use. These particles are affixed to numeral adjectives, and serve to point out the genus to which the preceding substantive belongs.

Tó, is the numeral affix applied to animals. When the number to be expressed is *one*, the generic particle precedes the numeral, as in Tsàng *tó nŭng, one elephant*; in every other case it follows the numeral.

¹Mü ²kakhün ³má ⁴nín ⁵Kai ⁶Sám ⁷tó ⁸an ⁹kwá ¹⁰yau.

¹Lást ²night ³jackal ⁴carried off ⁵thrice ⁶fowls.

¹Pc ²nán ³luk on ⁴yang ⁵song ⁶tó.

¹That ²goat ³has ⁴two ⁵kids.

Bai, is the numeral affix applied to such nouns as leaf, paper, umbrella, &c.

Nue, is applied to things round; Thep, and Phen, to flat substances; Phün, to pieces of cloth; Sen, to things having length; Ho, to bundles, packets and the like; Lem, to sticks, posts, spears, &c. Khót, to ropes, and such articles that can be coiled up; and Bán, to villages, hamlets, towns, &c.

OF PRONOUNS.

Gender has no place in the Khamti personal pronouns, nor do they undergo any variations indicative of *case*. As far as they are used as substantives, they form the various cases by receiving the prepositions already described as forming this branch of Khamti grammar; *number*, in nouns, as we have already remarked, is determined wholly by the context, or by certain circumstances attending the substantive. But as the pronouns, particularly in discourse, are frequently introduced without that connexion which could instantaneously enable the hearer to decide, whether one or many were intended, the Khamtis have adopted a mode to determine this independently of the connection; and in consequence make use of distinct pronominal terms to express the plural number.

The *personal* pronouns are

Kau, <i>I</i> .	Hau, <i>We</i> .
Maü, <i>thou</i> .	Maü sú, <i>Ye or you</i> .
Man, <i>He</i> .	Man khau, <i>They</i> .

The *reciprocal* pronouns are formed by adding the pronominal adjective Eng, to the personal pronouns, as Kau eng, *I myself*. Hau eng, *we ourselves*. Maü eng, *thou thyself*, &c.

The *relative* pronouns are Yang, and Süng, *who*; Süngti, *which*; and Khru, *that which*.

The *Interrogatives* are Phaü, *who*? An naï, *which*? Sang, *What*?

The *demonstrative* pronouns are An nai, *this*, and An nan, *that*.

The simple *indefinite* pronouns are, Kan phong, *some*; Táng, *other*; nang nai, *such*.

OF VERBS.

Verbs which have no inflection, can have nothing in them analogous to conjugation as in Greek, Latin and Sanskrit. The various kinds of verbs in Khamti must therefore be denominated wholly from their meaning and signification, as active, passive, neuter, causal, &c.

In the Indicative Mood the verb is in its simplest state, and unconnected with any other to modify its operation.

Only three tenses can be traced in this language, the Present, the Past, and the Future. In the Present, we have the verb in its simple state, in the Past, a particle is added, denoting completion or fulfil-

ment. And another particle, expressing will or determination, marks the Future.

The following will serve as a model for the variations a Khamti verb undergoes.

Kin, to eat.

INDICATIVE MOOD.—*Present tense.*

- | | |
|---------------------------------|-----------------------------------|
| 1. <i>Kau kin, I eat.</i> | 1. <i>Maü kin, We eat.</i> |
| 2. <i>Maü kin, Thou eatest.</i> | 2. <i>Maü sú kin Ye eat.</i> |
| 3. <i>Man kin, He eats.</i> | 3. <i>Man khau kin, They eat.</i> |

Past tense.

The particle *yau* is added to the verb.

1. *Kau kin yau, I did eat or have eaten.*
2. *Maü kin yau, Thou didst eat, &c.*
3. *Man kin yau, He did eat, &c.*

In the same manner through the plural number.

Future tense.

The particle *ta* is prefixed to the verb.

1. *Kau ta kin, I shall eat.*
2. *Maü ta kin, Thou shalt eat.*
3. *Man ta kin, He shall eat.*

And so on through the plural number.

The participial form is denoted by the particle *an*, put before the verb:—*An kin, eating.*

The *Imperative Mood*, which is used only in the 2nd person, is denoted by the particle *Dá* subjoined to the verb *Kindá, eat thou. Kwá dá, go thou.* This particle, however, is often omitted in common conversation. As in English, the Khamti admits of the introduction of another verb in the 3rd person. *Hü, give*, is used as the auxiliary verb *let. Hü kin, let him eat. Hü yú, let him stay.*

The *Potential Mood*, which includes the idea of *power* or *ability*, is commonly expressed by

Pe, can. Man kin pe, He can eat.

Káu khan-khan len pe, I can run fast.

Duty or *obligation* is expressed by prefixing the particle *Nai.*

Man nai kin, He must eat.

Kau hang maü ta nai pe I must beat you.

The *Subjunctive Mood*, which is used to give a conditional force to

the verb is expressed either by Sang, prefixed, or Zam, affixed to the verb; *Kau kin zam, If I eat.*

Sang tüt háng man, ta khán, *If (you) pull her tail (she) will scratch (you.)*

The *Prohibitive* form, is denoted by the particle Pai, or Yá, prefixed to the verb.

Pai kin, *eat not.* Maü pai lak, *thou shalt not steal.* Yá nye, *do it not.*

Simple *Negation* is implied by Ma, or Mo prefixed to the verb.

Kau ma kin, *I do not eat.*

Man mo pengasang, *He does nothing.*

When a question is asked the particles Gai and Kái, are usually added to denote *interrogation*.

Maü kwá thaü gai? *Where have you been.*

Hang man maü po, ma caü gai? *You beat him, did you not?*

Tán phú dĩ kiat kái? *Is this man angry?*

Kai kái, kaú kái? *Is it far or near?*

PARTICLES.

Adverbs. An adverb generally follows the word which it modifies, whether it be an adjective or a verb—

Manai, *to dry.*

Pelá, *when.*

Mangá, *yesterday.*

Ti lang, *afterwards.*

Sün, *the day before yesterday.*

Phé, *here.*

Maphok, *to-morrow.*

Han, Pún, *there.*

Tsaü, *early.*

Lang, *immediately.*

Meu tsaü, *early in the morning.*

Köi, *slowly.*

Nam, *first.*

Khín, *quickly.*

Lún, *last.*

Meün meün, *equally.*

Kiá, *ever.*

Perá het, *wherefore.*

Mai kiá, *never.*

Perá nan, *therefore.*

Sakti, *at once.*

The *Prepositions* in common use are :

Tí, *in, at, to.*

Kap, *with.*

Luk, *from.*

Neu, *upon.*

Kon, *after.*

Lum, *below.*

Nai, *in.*

Lang, *behind.*

Him, *near.*

Dang, *according to.*

Bón, *above.*

Tóngná, *in presence of.*

Hang, Thúng, *to, unto.*

Há mai, *without, destitute of.*

The Conjunctions are—

Tak, Le, *and*.Ik, *besides, moreover*.Khau, *if*.Ik lau, *yet again*.Unkan, *unless*.Tewá, *but, except*.Pcrá, *because*.Hu, *or*.

The construction of the language is simple and inartificial, adhering to what philologists term the *analogous* idiom, that is, ideas are expressed in the natural order in which they occur to the mind. The nominative regularly precedes the verb, and most frequently the verb precedes the case which it governs.

SENTENCES.

The following sentences are introduced to exemplify the preceding remarks :—

Má hau, *The dog barks*.

Miau ta wám nú, *A cat will catch mice*.

Lapséng ko han pe, *She can see in the dark*.

Nók nai hong ma nai nyin gai? *Do you not hear that bird singing?*

Khai man maü pai lak, *Do not steal her eggs*.

Sang maü lak, tang wan man ta hai yan, *If you steal them, she will cry all day*.

Yong, luk on ní, *Yong is a good boy*.

Kau ma pin pe, man ma wá, *He does not say, "I cannot do" (it.)*

Kánháu lang nín nai phaü té má? *Who made the heavens and the earth?*

THE LORD'S PRAYER IN KHAMTI.

Po tú khá, an ú nũ kánh háu nai, nang cū* máü cau, róse kóyam haü, yang nui né; haü má té mán, té mǝng maü cau, nui né; nang aló maü cau, khaü caü nũ fá kánh háu pyé zóng nang hũ ko, lang nín mǝng kánh haü, pin nang nan ta khá tá. Hang hau manai cá kin haü nui ta khá tá. Kun phit hang hau nai hau poi nang hũ ko, apet tú khá khaü poi haü many nan ta khá tá—Apet kyám nai hang han pai haü com; tí hái tí yák poi lot haü nui ta khá tá.

THE SINGPHO.†

The territories occupied by the Singphos extend from the Patkoi range to the Brahmaputra, or from the 27° to the 28° N. Lat. and from

* C is sounded as in Czar, or like Ts.

† My acknowledgments are due to the Rev. M. Bronson for the kind assistance received from him while drawing up the following remarks.

the frontier of Asam to the Langtang mountains on the east. Their language is common to numerous tribes occupying all the northern portions of the Burmese empire. About one fourth of its vocables are allied to the Burmese, and an equal proportion to the dialect of Manipur. Its intonations are similar to those of its cognate, the Burmese, and its grammatical construction precisely the same. It is peculiar for its combinations of consonants, many of which would at first sight appear quite unpronounceable to a European. It has properly no numbers, cases, nor flections in its nouns; nor conjugations, moods, tenses, or persons in its verbs. Many words have a substantive, adjective, or verbal signification, according to their position in a sentence; but in general, the names of objects, qualities and actions are sufficiently distinct from each other. Hence, in its structure and expression, the language is exceedingly simple.

OF NOUNS.

Cases are usually denoted by post-positive particles. As in all languages, the Nominative is the noun in its simple state.

The Genitive is sometimes denoted by its position before another noun, but more frequently by the particle Ná, put after it. As in Kansu-ná rung, or Kansu rung, *a cow's horn*.

The Dative case is usually marked by the particle Fe; though it is not unfrequently omitted when the noun is used before a verb signifying *to give*, &c. in which instance the case of the noun is sufficiently intelligible. *Exam*: Singpho óráwá ngai ngú yáhá, *I gave that man rice*. Ngai-fe lik náng galóui nyádai, *You never gave me a book*.

The Accusative case is the same as the nominative, distinguished only by its position in a sentence. *Exam*: Náng mumúng miríhá í? *Did you buy the mangoes?* Ora kansú cu nyádai, *That cow does not give milk*.

Under the case generally termed the Ablative, is included a variety of ideas, distinguished in Sanskrit by the Instrumental, the Locative, and the Ablative. These may all be expressed in Singpho by the use of post-positive particles.

Mbá, *a cloth*. Mbái kacúlú, *Wipe it with a cloth*.

Sirá, *place*. Khiná sirá-i-dáu, *Put it in its place*.

Simí, *a lamp*. Simí-goi namán datu, *Put oil into the lamp*.

Sometimes the particles are omitted: as in Ndí ncín datu, *Fill the pitcher (with) water*.

A Singpho noun admits of no change to indicate the plural number. Except where the noun itself expresses a plural idea, a numeral adjective is usually added.

Nor are there any traces of a distinction of gender by the use of terminal affixes. Yet the language is not entirely destitute of substantives descriptive of the gender. In the case of human beings gender is usually distinguished by distinct terms : as in

Singpho, <i>man</i> .	Númsyá, <i>woman</i> .
Wá, <i>father</i> .	Nu, <i>mother</i> .
Máng, <i>boy</i> .	Síwí, <i>girl</i> .

In the case of the inferior animals, the words Lasa, *male*, and Núm-sá, *female*, are added to the specific terms.

OF ADJECTIVES.

The position of an adjective in a sentence is invariably after the noun it serves to qualify.

Nein punglúm khou, *pour (in) hot water*.

Singpho kunkhán galóui-mung nsú-á.

An idle man never can be rich.

As the language rejects terminations of every kind, it of course has none to mark the degrees of comparison. Comparisons are therefore made by particles expressive of number or quantity.

Ngai sindi báhá, *I am very weary*.

Ndai latai gráudai, *This is the greatest of all*.

NUMERALS.

The Singpho numerals are—

- | | | | | |
|------------|-----------|-----------|-----------|-----------|
| 1. Aimá. | 3. Masúm. | 5. Mangá. | 7. Sinit. | 9. Cekhú. |
| 2. Nkhong. | 4. Melí. | 6. Krú. | 8. Macat. | 10. Sí. |

After which the ordinals are repeated and compounded.

- | | |
|----------------------|----------------|
| 11. Sí-ai. | 100. Lat-cá. |
| 12. Sí-nkhong. | 200. Ní-cá. |
| 13. Sí-masúm, &c. | 300. Masúm-cá. |
| 20. Khún. | 400. Melí-cá. |
| 21. Khun-ai. | 500. Mangá-cá. |
| 22. Khun-nkhong, &c. | 600. Krú-cá. |
| 30. Tumsí. | 700. Sinit-cá. |
| 40. Melí-sí. | 800. Macat-cá. |
| 50. Mangá-sí. | 900. Cekhú-cá. |
| 60. Krúsí. | 1000. Hing. |
| 70. Sinit-sí. | 10,000. Mun. |
| 80. Macat-sí. | 100,000. Sen. |
| 90. Cekhú-sí. | |

OF PRONOUNS.

The Personal pronouns are Ngái, *I*, Náng, *Thou*, and Khi, *He*, *She* or *It*; the specific signification being distinguished only by the connection in which it stands. Distinct terms are used to express the plural number. *I*, *we*; Nithen, *ye*; and Khini, *they*.

The variations of *cases* are indicated in the same manner as in the case of substantives.

The *Possessive* pronouns are the same as the personal, with the genitive particle affixed.

The *Relative* pronouns are, Gadaimá, *who*; and Gadémá, *which*; used also in an *interrogative* sense, with Phakaimá, *what*?

The *Demonstrative* pronouns are, Ndai, *this*; and O'rá, or O'ráwá, *that*.

OF VERBS.

The moods and tenses of verbs are expressed by means of particles, or significant words.

INDICATIVE MOOD.

Present tense. The verb in its simple state is often used as the form of the present tense, Ngái dúp, *I strike*. Khi sú, *He speaks*. The verb Dai, *to be*, is sometimes added as an auxiliary. Ngái dup-dai, *I strike* or *am striking*. Ngái sú-dai, *I speak* or *am speaking*.

Past tense. This tense is denoted by the particle há. Thus Khi dúp-há, *he did strike*. Náng sú-há, *thou didst speak*.

Perfect tense. Here the particle há, and the verb dai are conjoined. Thus, Ngái dúp-há-dai, *I have struck*. Náng sú-há-dai, *thou has spoken*.

Future tense. The particle á added to the verb denotes future time. Khi dúp-á, *he will strike*. Ngái sú-á, *I will speak*.

The Infinitive Mood, or more properly, the Gerund, is indicated by the addition of the particle Ijóí, *for*, *for the purpose of*. Dúp-ijóí, *to strike*. Sú-ijóí, *to speak*.

Participles.

Present. Dúp-yang, *striking*. Sú-yang, *speaking*.

Past. Lángdi, *having taken*. Sú-ngdi, *having spoken*.

The Imperative Mood is formed by the addition of the particle U, to the root of the verb. As in commanding, it is obvious it is only the 2nd person that is addressed, this mood may be said to exist only in that person.

Dúp-ú, *strike thou*.

Sú-ú, *speak thou*.

Prohibition is implied by prefixing the word Phung, or Kúm to the form of the imperative.

Phung dúp ú, *do not strike.* Kúm lug-ú, *do not steal.*

Negation is expressed by the suppressed sound of the letter N; put before the verb in its different tenses. Ngái ndúp-dai, *I do not strike.* Ngái ndúp-há, *I did not strike.* Ngái ndúp-á, *I will not strike.*

POTENTIAL MOOD.

When *power* or *capacity* is intended to be implied, the word Ngutá, *able*, is added to the root of the verb.

Ngái dúp ngutá, *I can strike.* Khi sú ngutá, *he can speak.*

In the negative form it becomes Ngái dúp n-ngutá, *I cannot strike.* Khi sú n-ngutá, *he cannot speak.*

Desire is expressed by the verb Rá, *to wish*, put between the root of the verb and the auxiliary.

Ngái dúp-rá-dai, *I wish to strike.* Khi sú-rá-dai, *he desires to speak.*

Interrogation is implied by the particle I, added to the verb, provided the verb ends the sentence.

O'rá wá ning-chin-dai, Náng aká-í? *That bird sings, do you hear (it)?*

Náng-ne ngkhritá í? *Do you dread (it)?*

When there is no verb in the sentence the interrogative particle Má is commonly used.

Ndai lik gadémá má? *Whose book is this?*

These particles are omitted when any other word in the sentence implies interrogation.

Náng khi-fe pharai dup-há-dai? *Why have you struck him?*

Particles.

Adverbs in Singpho usually precede the verbs they serve to qualify.

Gáláu, <i>quickly.</i>	Gáláu di-ú, <i>do it quickly.</i>
Lúimá, <i>a little.</i>	Lúimá khring-ú, <i>wait a little.</i>
Aidi, <i>well.</i>	Aidi dúng-ú, <i>sit prettily.</i>
Nong-nong, <i>daily.</i>	Nong-nong ngái-fe tsu rá-dai, <i>I want milk daily.</i>
Leni khringi, <i>every other day.</i>	Leni khringi joi ngái fe wá rá-dai, <i>I want a pig every other day.</i>
O'rate, <i>yonder.</i>	O'rate phung sá-ú, <i>do not go yonder.</i>
Tukhui, <i>in.</i>	Tukhui lúng-ú, <i>come in.</i>
Singándi, <i>out.</i>	Singándi prú-ú, <i>go out.</i>
Gadé, <i>how much, or how many.</i>	Nána mumúng gadé ngá? <i>how many mangoes have you?</i>

The Prepositions of occidental languages are, in Singpho, rendered by *Post-positive particles*.

SENTENCES.

Maráng tú-á, *it will rain.*

Chong lá-ú, *bring an umbrella.*

Ján já pyou-dai, *the sun is very hot.*

Nána lágóng gágri cúdai, *your feet are very dirty.*

Khái sáu kicinu, *go to the river and wash them.*

Náng phakai mungli dí ngutá? *what work can you do?*

Náng phakaimá ngúdai? *what do you say?*

Ngaiea gá sú-yango, náng phung sú-ú, *when I am speaking, do you not talk.*

Nána munglí dí phung maláp-ú, *do not forget to do your work.*

Ngaina lettá ketsin yang, kísá hádai, *he went when I was washing my hands.*

Nána liung ningdung kísá midit-ú, *dip the end of your finger in water.*

Ngai sigá yángo gáláu sáu, *when I call come quickly.*

Nángi ntséng yángo, kísá madún-á, *if you do not know he will show you.*

Phrá aimá ngá-dai, *there is one God.*

Phrá ndai mú sijo há-dai, *this God built the heavens.*

Khí ngá sijo-hádai, *he created the earth.*

Ngai-fe, náng-fe, singpho yong-fe kísá sijo-hádai, *he made me and you and all men.*

Phune ketsing, tso-de bum, khá-nu gubá, jan, *the green tree, the high hill, the great water, the sun.*

Sítá, sigan túdai, sijo-hádai, *the moon, the shining stars, he made.*

Yong sera-í mú-dai, *he sees in all places.*

Ningthó-i múdai sat, ningtsi-ni mang múdai, *as he sees in light, so he sees in darkness.*

Náng di-dai theng, kísá yong chéng-dai, *whatever you do, he knows all.*

THE NAGA.

That large extent of mountainous country, bounded on the west by the Kopili river, the great southern bend of the Barak, and the eastern frontier of Tipperah, in nearly east longitude 83°; on the north by the valley of Asam; on the east and south-east by the hills dividing Asam from the Bor-Khamti country in longitude 97°, and the valley of the Kyendrens; and on the south by an imaginary line, nearly correspond-

ing with the 23rd degree of north latitude, is inhabited by numerous tribes of Highlanders, known to the Asamese by the general name of Nagas. Whatever may be the origin of the word, it appears that the appellation is entirely unknown to any of the hill tribes themselves. They are divided into numerous communities or races, and they know themselves by the designations of their respective tribes only, and not by any name common to all the races.

There appear however to be some marks by which these tribes are distinguished from their neighbours, and some common ties by which they are all bound together as one people, though at present divided into tribes by a diversity of dialects. These dialects are sometimes so different that two adjoining tribes cannot converse together, except through the medium of a third dialect common to both; yet they are said to intermarry and form connexions and alliances with each other, which they do not do with tribes not belonging to the Naga community.

The Nagas also appear in general to be distinguished from their neighbours by physical conformation; for though there is much difference in this respect amongst them, yet they are in common remarkable for extremely coarse, savage countenances, and dull, timid, heavy dispositions.

My investigations, for the present, have been confined to the dialect spoken by the Námsángiyás, a tribe occupying the hills near the sources of the Boori Dihing river. To the Rev. Mr. Bronson of Nowgong, I am indebted for the valuable aid he has afforded me in these enquiries.

OF NOUNS.

Comparatively copious as is the grammatical apparatus of this language, it possesses no affixes by which to designate the cases of its nouns.

The Genitive case is denoted merely by the juxta-position of the two substantives, the former being understood to be in the genitive.

Kien ngiupo phyet-ó, *Milk the goat, (or literally,) draw the goat's milk.*

In the other oblique cases, the noun is followed by the distinguishing adjunct, Nang; sometimes with, though more frequently without the addition of a post-positive particle.

Ham-nang vauró, *Bring a mat.*

Ira minyáng-nang láko-tak, *I gave it to that man.*

Sán-nang lam-ó, *Put it in the sun.*

Jó-nang Kien-ó, *Fill it with water.*

The particles Má and Pá are frequently used as affixes to nouns singular, but they seem to be merely euphonic, and have no definite signification attached to them.

The particle He, is employed in the same manner, but only in cases where plurality is implied. It is, however, often omitted; and then the plural number is distinguished by the collective or plural idea expressed by the noun, or by the addition of a numeral adjective.

The difference of gender in individuals of the human family is denoted by distinct terms; in the case of all other animals, the appellatives Póng, *male*, and Nyóng, *female*, are added to the noun.

Masculine.

Feminine.

Mi-nyán, *man.*

Dehiek, *woman.*

Delá, *husband.*

Tang-nyú, *wife.*

Vá, *father.*

Ing-yong, *mother.*

Iphó, *brother.*

Ing-yáh, *sister.*

Mán-pong, *a bull.*

Mán-nyóng, *a cow.*

Hú-pong, *a dog.*

Hú-nyóng, *a bitch.*

Kien-póng, *a he-goat.*

Kien-nyóng, *a she-goat.*

OF ADJECTIVES.

In composition, an adjective invariably follows the noun it serves to qualify.

¹Írá ²kien ³ngiu-po ⁴asan ⁵ko-á, ¹that ²goat ⁵gives ⁴good ³milk.

Adjectives in this language admit of no variations expressive of number, case, or gender, or even of the degrees of comparison. But as the comparison of one person or thing with another so as to ascertain the relative quality possessed by each, must necessarily exist in every language, we find that the general mode of forming comparison among the Námsángiyás, is merely by placing the adjective after the noun with which the comparison is made, the noun being put in the oblique form. Ngámá íra mi-nyán-nang áló, *I am taller than that man*, or literally, *I that man tall.*

Ngámá íranangmá ajá ilamang, *I want more than that.*

Jó or Linjó is often added to an adjective to express a quality as existing in the highest degree.

Ira deliiek phangsan jó, *that woman is very handsome.*

Árá arímá asan linjó, *that fruit is exceedingly nice.*

NUMERALS.

The numeral system of the Námsángiyás is emphatically decimal—of the ten fingers. Thus they count.

1. Vánthe. 3. Vánram. 5. Bangá. 7. Ing-it. 9. Ikhu.

2. Ványi. 4. Belí. 6. Írók. 8. Ísat. 10. Íchi.

and then throwing their fingers in an imagiuary heap they exclaim, Ruak, *a decade.*

11. Íchi vanthe, 10+1. 20. Ruak nyi, *two decades.*

12. Íchi vanyi, 10+2. 30. Ruak ram, *three decades.*

13. Ichi vanram, 10+3, &c. 40. Ruak beli, *four decades.*

and so on till they come to Chá, *a hundred.*

100. Chá-the. 300. Chá ram, &c.

200. Chá-nyi. Chá íchi, *ten hundred or 1000.*

OF PRONOUNS.

The *personal* pronouns are, Ngá, *I*; Nang, *thou*; and Ate, *he, she, or it*. As the pronoun, is next to the verb, the most important part of speech, and that from which the verb chiefly derives its precision, we find in this language the use of distinct terms to express the plural number. They are, Nimá, *we*; Nemá, *ye*; and Sening, *they*.

In, what we have termed, the oblique form, these pronouns take the particle Nang after them, as in the case of nouns.

Ngánang.	Nanguang.	Atieng.
Nimánang.	Nemánang.	Seningnang.

Atieng, appears to be merely a contracted form of Ate-nang, the one term is as commonly used as the other.

The *possessive* pronouns are I, *my* or *our*; Má, *thy* or *your*; and Á, *his*, or *their*. They are invariably used before the nouns with which they are connected.

Árápá í lách, *this (is) my kite*

Mámá vá nyóng-nang veó, *honour thy father and mother.*

In this sentence the first syllable má, is the pronoun, the second euphonic particle.

Ánáppá ajun jó, *his hair (is) very soft.*

The particle ráng, is often added to the above pronouns.

Íráng mók itongá, *the horse is mine.*

Áráng hum itongá, *the house is his.*

The *demonstrative* pronouns are, Árá *this*; and Írá, *that*, with their plurals Áráhe, *these*, and Íráhe, *those*. They precede the nouns they serve to point out.

Írá khat-pá ílamang, *I want that cloth*. Árá-pá jo-kó, *drink this water*.

The *interrogative* pronouns are Haná or Hammá, *who?* and *which?* and Chenná, *what?*

OF VERBS.

The Námsángiyá verb appears to be the most interesting part of its grammar. It has but one form of conjugation, and the various modifications of an action are expressed by the addition of terminations to the verb expressing the action. The terminations are the same in both the singular and the plural numbers.

Thien, TO PUT.

INDICATIVE MOOD. *Present tense.*

1. Thien-ang, *I put*. 2. Thien-ó, *thou puttest*. 3. Thien-á, or é, *he puts*.

Past tense. 1. Thien-tak, *I did put*. 2. Thien-tó, *thou didst put*. 3. Thien-tá, *he did put*.

Perfect tense. 1. Lá-thien-tak, *I have put*. 2. Lá-thien-tó, *thou hast put*. 3. Lá-thien-tá, *he has put*.

Future tense. 1. I-thien-ang, 2. I-thien-ó, 3. I-thien-á, or é. *Gerund.* Thien-ráng. *Participle continuative.* Thien-limá, or lámá.

The Imperative form is the same as that of the 2nd person Present tense.

When it is necessary to give a *conditional* or *subjunctive* force to the verb, the particle O'kó is affixed to the verb in its various forms.

Thienang ókó, *if I put*. Thienó ókó, *if thou put*. Thiená ókó, *if he put*, &c. &c.

The *potential* form, used to express power or ability, is denoted by the use of the verb Tá, *to be able*, as an auxiliary.

Tá thienang, *I can put*.

In conjunction with this form of the verb, we find a peculiar use made of the *possessive*, instead of the *personal* pronoun. Thus instead of saying Ngá tá-thienang, *I can put*. Nang tá-thienó, *thou canst put*, we find the conventional form to be,

1. Itá thienang, *I can put*. 2. Mátá thienó, *thou canst put*. 3. Átá thiená, *he can put*.

The negative form is denoted by the addition of the negative particle Mak, to the auxiliary verb.

1. Itá mak thienang, *I cannot put*. 2. Mátá mak thienó, *thou canst not put*. 3. Átá mak thiená, *he cannot put*.

When the necessity of an act is to be expressed, Thing is compounded with the verbal root.

Ngá thien thing, *I must put*. Nang thien thing, *thou must put*. Ate thien thing, *he must put*.

Prohibition is expressed by the use of the negative particle Mak, or Nak, immediately before the verbal root.

Má dak nak sakó, *do not lay your hand (on it)*.

Inang mak kánó, *do not go there*.

To express simple negation the particle Mak, or Má is put after the root of the verb.

Árá hú-má kak má, *that dog does not bite*.

Á ingyong-má kómá-tá, *his (or her) mother did not give (it)*.

Minyán moót ahó dang-má-okó, *if the man has not any work*.

Interrogation is denoted by the particles ne, á, or le added to the end of the sentence.

Jó aló le? *is the water deep?*

Nang-má ehenná lam-ó á? *what do you seek?*

Majā nang sóijáng má luto ne? *did you not catch a pea-fowl yesterday?*

OF ADVERBS.

Adverbs are used to qualify verbs and adjectives; and in composition they usually precede the verb, and follow the adjective.

Áchánmá, *fast*. Áchánmá lu-ó, *hold fast*.

Jó, *very*. Írá natá-ma alang jó, *that boy (is) very cross*.

Tajā, *to-day*.

Há ló, *afar*.

Ni-nap, *to-morrow*.

Rangjánang, *in the evening*.

Majā, *yesterday*.

Rankhánang, *in the morning*.

Dokko, *now*.

Khorók, *quickly*.

Áuang, *here*.

Aré, *slowly*.

Ínang, *there*.

The CONJUNCTIONS are

Iroková, *and*.Iróókomin, *but*.Min, ákomin, *also*.Cherángmá, *for, because, &c.*Okó, *if*.

POST-POSITIVE PARTICLES are used in this language in the same manner as the prepositions of occidental tongues.

Pungmá, *with*. Nyunang, *within*. Akhan, *under*. Vá, *from*.

Nyu, *in*. Khonang, *upon*. Dumnang, *by means of*.

SENTENCES.

Rang i-pathá, *It will rain*.

Khat-húp vanró, *Bring an umbrella*.

Sán-má lang-má sai hang, *The sun is very hot*.

Má dánang mak ahang jo, *Your feet are very dirty*.

Jónang kál-o má suan-o, *Go to the river and wash them*.

Nangmá chen móot i-ta-móo? *What work can you do?*

Nangmá chen ngait-o? *What do you say?*

Ngámá ngin mathu mathóithak, iraphímá nang nak thó thóo, *Do not talk when I am speaking*.

Nangmá móot moot ráng nak lakó, *Do not forget to do your work*.

Ngá idak matúmá suantak, até lá-ká-tá, *He went when I was washing my hands*.

Má dak sútúnpá jó-nang lúmsú-ó, *Dip the end of your finger in water*.

Nangmá ma jet-kókó, até má chen i-khésaká, *If you do not know then he will show you*.

Katakrang ván the itóngá, *There is one God*.

Yrá katakrang-pá rang tiek-tá, *This God built the heavens*.

Até-má há mìn tiek-tá, *He created the earth*.

Ngá, nang-nang, hueri minyán nang tiek-tá, *He made me and you and all men*.

Bang áhing há hó acúong, jó a dóng, sán, dáfe, mérik achúm, tiek-tá, *The green tree, the high hill, the great water, the sun, the moon, the shining stars, he made*.

Phang-tang lát-nang ekhe-á, *He sees in all places*.

Rangvonang maró ekhé-á, rang-nyak-nang min iro ekhé-á, *As he sees in light, so he sees in darkness*.

THE LORD'S PRAYER.

I'ra ní rang nang tongte Vá, má ming pujá chen dánhá, ma nok ngyárang chen sóngá; rang nang maróá, íróá há-nang madákú chen sóngá. Tejá ní aphak acháí nínang kóhi. I'roková ní thá-pétenang nímá marórang lietang, irarangrang ní thápé pá tinghi. Nínang tóam-nang nak káthi, íková nínang cham chó túkó pamhi; chenmá róantang róanjang nok, ákomin chan, akomin móhimá, uráhé maráng, író chen dánhá.

THE MIKIR.

The Mikirs occupy a tract of hilly country situated within the boundaries of the District of Nowgong in Central Asam, which covers an area of about 1710 square miles. Besides the unmixed communities that occupy these hills, numerous families of Mikirs are scattered all over the south bank of Lower Asam. They are always changing their locations; seldom continuing above three or four years in one place; and are mostly employed in cultivating the land for rice and cotton.

At the lowest computation the entire population of the Mikirs may be estimated at about 26,000 souls.

Living as they do in a rude state of society, and possessing no written language, it is no easy matter to trace their origin. They have a tradition that their ancestors originally came from the Jaintia hills; which might be assumed to be correct, from the circumstance of their having a few Jaintia words mixed up in their vocabulary. I have had no opportunities yet of making any comparison between the two languages. This task I reserve for a more convenient season.

The sounds of the Mikir language are pure and liquid, and in a great measure devoid of gutturals or strong aspirates. A slight nasal inflection and an abrupt cadence common to many of the vocables, are peculiarities this language possesses in common with all the Indo-Chinese monosyllabic dialects.

OF NOUNS.

Nouns admit of no variations expressive of *number*; the plural state is generally defined by a numeral, or some other word expressive of quantity. Thus, Árleng, *a man*. Ápánáng árleng, or Ákó-óng árleng, *many men*.

Ácharong, *a cow*; Jónphungó áchorong, *five cows*.

Nor are the accidents of *case*, distinguished by any inflections or dif-

ferences of termination. The Genitive case is denoted merely by the juxta-position of the two substantives ; the former being understood to be in the genitive case.

Oi áti, *a bird's nest*. Jálong ánuK, *a buffaloe's horn*.

The Accusative is the same as the nominative, and is distinguished only by its position in the sentence.

The other relations of nouns are marked by the use of post-positive particles.

Yok, or Ayok is most commonly used to mark the person receiving, or as the Dative particle.

¹Ne ²mú ³áyok ³tárámo, *I have called my brother*.

¹Árweng ²ne ³yok ³pi, *Give me a feather*.

The Ablative is expressed by the particle Pará, or Rem-pará ; and the other cases are denoted by corresponding significant particles as in English.

Gender, in individuals of the human family, is marked by the use of distinct terms.

Pensó, *man*. Ápinghán, *husband*. Apó, *father*. Áte, *brother*. Ymu, *ditto*.

Árlossó, *woman*. Ápisó, *wife*. Áió, *mother*. Báí, *sister*. Ingjil, *ditto*.

In the case of the inferior animals, the appellatives Alo, *male*, and Ápe, *female*, are added to the noun.

Ingnár, *an elephant*, *Masc.* Ingnárálo, *Fem.* Ingnarápe.

Musung, *a deer*, *Masc.* Musungálo, *Fem.* Musungápe.

Kipi, *a monkey*, *Masc.* Kipiálo, *Fem.* Kipiápe.

Nouns derived from verbs, usually have the particle, “po” affixed to the original form of the verb. Thus, from Kichiháng, *to beg*, we have Kichihángpo, *a beggar*.

OF ADJECTIVES.

Adjectives do not alter their terminations to express either number, case or gender. They always follow the nouns they qualify.

Áláng kángsám, *cold water*. Lek áklak, *white beads*. Áso kángtuk, *a fat boy*.

Grades of quality are denoted by the particles Si and Sat subjoined, or by such words as Árlo, and Játsi, put before the adjective. Comparison, whether expressed by distinct words, or incrementory particles, is unknown to the language.

Ákleng, *great*. Ákengsi, *very great*. Árlo ákleng, *exceedingly great*.

Ákiding, *long*. Ákidingsat, *very long*. Ngodáh, *bad*. Játsi ngodáh, *thoroughly bad*.

The mode of numeration that obtains among the Mikirs, presents us with a few interesting peculiarities.

THE NUMERALS are

Ichi,	1.
Hini,	2.
Katham, ..	3.
Phili,	4.
Phong,	5.
Thorok,	6.
Thorchí, ..	7. this is Thorok 6, and Ichi 1=7.
Nirkep,	8. literally 10—2=8.
Chirkep, ..	9. „ 10—1=9.
Kep,	10.
Then follow Kepáichi ..	11, or 10 + 1.
Kepáhini, ..	12, or 10 + 2, and so on till
we come to Kepákep, ..	20, or 10 + 10, which is also
expressed by Ingkol,	a score. Then follow
Ingkol-ichi, .	21.
Ingkol-hini, .	22.
Ingkol-katham, ..	23, &c., till we come to the third
decade, Katham-kep, ..	30, or 3×10.
Hini ing kol,	40, or two score.
Hini ingkol lá kep,	50, or two score plus ten.
Phár,	100.

The above numerals as far as *six*, that is all the simple ones, it will be observed, assimilate to those in use by the Gáros, and are most probably to be traced to the same origin. It is also worthy of remark, that the peculiarity noticed in the use of the Gáro numerals, as applied to men, to inferior animals, and to inanimate things, exists also in the specific application of the Mikir cardinals.

When enumerating individuals of the human family, the word *Báng* is prefixed to the numeral. Áte báng hini, *two brothers*.

When the numeral is applied to any inferior animal, the word *Jón* is used instead. Jón phongo áchorong, *five cows*.

And Hong, and Páp, are indiscriminately prefixed to numerals when applied to inanimate objects.

OF PRONOUNS.

There is no distinction of Gender in the pronouns of this language. In the case of the 1st and 2nd person, the sex is supposed to be known, and in the 3rd person it must be inferred by a reference to its antecedent.

The Personal pronouns are—

<i>Singular.</i>	<i>Plural.</i>
Ne, <i>I.</i>	Áli, <i>we.</i>
Náng, <i>thou.</i>	Náli, <i>you.</i>
Álang, <i>he, she, it.</i>	Ánáli, <i>they.</i>

The relations of *cases* are denoted in the same manner, as already exemplified with reference to nouns substantive.

Ne ne sál inghol, *I do my work.*

Ne yok sáng biso he, *give me a little rice.*

The Demonstrative pronouns are Lápen, the proximate, and Ilápen, the remote. These are reduplicated to denote the plural. Lápen lápen, *these.* Ilápen ilápen, *those.*

The Interrogative pronouns are Inghone, *who?* and *which?* and Mpópi, *what?*

Relative pronouns are very vague, indeed I am not aware of the existence of any; the sentence being generally so rendered as to obviate the necessity of them. Thus, instead of saying “the man who went,” a Mikir would say, Árleng gidám, *the gone man.*

OF VERBS.

The various kinds of verbs in this language must be denominated wholly from their meaning and signification, as active, passive, neuter, causal, &c.

The Indicative Mood, is the verb in its simplest state, unconnected with any other to modify its operation.

The relations of time are expressed by affixes, except in the *present tense*, which may be taken as the root of the verb.

Verbs undergo no modification consequent on number or person.

Present tense. Ne doh, *I am*; Náng doh, *thou art*; Áláng doh, *he is.* Áli doh, *we are*; Náli doh, *ye are*; Ánáli doh, *they are.*

And so in the case of any other verb.

Ne Cho, *I eat*. Ne Inghol, *I do*. Ne Dá, *I go*.

Present definite. Ne Chodoh, *I am eating*. Ne Ingholdoh, *I am doing*. Ne Dámdoh, *I am going*.

Past tense. Ne Cho lóh, *I did eat*. Ne Inghol lóh, *I did do*. Ne Dámoh, *I did go*.

Future tense. Ne Choye, *I shall eat*. Ne Ingholye, *I shall do*. Ne Dámye, *I shall go*.

Future, implying a determination, Ne Cho bó, *I will eat*. Ne Inghol bó, *I will do*. Ne Dá bó, *I will go*.

Future, a more expressive form. Ne Cho báng, Ne Inghol báng, Ne Dámláng.

The Gerund is denoted by prefixing Ki, and adding Áyok to the root of the verb.

Ki-cho-áyok, *to eat, for the purpose of eating*.

Ki-inghol-áyok, more frequently contracted into Nánghol-áyok, *to do, for the purpose of doing*.

Ki-dám-áyok, *to go, for the purpose of going*.

PARTICIPLES.

Present. Chosi, *eating*. Ingholsi, *doing*. Dámsi, *going*.

Past. Cho po, *having eaten*. Inghol-po, *having done*. Dámpo *having gone*.

Continuative. Chosido chosido, *continuing to eat*. Ingholsido, *continuing to do*. Dámsido dámsido, *continuing to go*.

The Imperative Mood, is used only in the 2nd person.

The simple verb in the present tense, 2nd person, is often used in an imperative form.

Náng Cho, *eat thou*. Náng Inghol, *do thou*. Náng Dám, *go thou*.

Sometimes the particle Noh, is added to give more force to the command.

Cho noh, Inghol noh, Dám noh.

Prohibition is denoted by the use of the particle Ne after a pronoun, or Ye, after a verb. Thus,

Cho náng ne, *eat thou not*. Cho ye, *eat not*.

Inghol náng ne or Inghol ye, *do it not*.

Dá náng ne, or Dá ye, *go not*

The Potential Mood, expressing ability, capacity, &c. is denoted by the use of the word Un, *can*. Thus,

Ne cho un, *I can eat.* Ne inghol un, *I can do.*

Ne dám un, *I can go.*

Ne cho un ye, *I cannot eat.* Ne inghol un ye, *I cannot do.* Ne dám un ye, *I cannot go.*

Interrogation is implied by the particle Má, placed after the verb.

Náng án cholo má? *Have you eaten rice?*

Ne inghoáyok piye má? *To whom shall I give it?*

When any other word is introduced into a sentence rendering the interrogation clear and explicit, the particle Má, is omitted as unnecessary.

Náng ánga kodák dolo? *Where were you before?*

Simple negation is expressed by the particle Iong, introduced at the end of the sentence. It is sometimes changed into He.

Lebángso olángpi ók iong, *there are no fish in this river.*

Aláng ikotáng inghol he, *he does not do any thing.*

PARTICLES.

The prepositions used in occidental languages are in Mikir rendered by post-positive particles.

¹Náng ²dung ³phurul ⁴do, ⁴there ³is ²a ¹snake near you.

¹Ládág ²pára ³me ⁴wán, ⁴bring ³the ²fire ¹from that place.

Adverbs appear to be used indiscriminately either before or after the verbs to which they are joined.

Mon, Monon, *now.*

Mináp, *to-morrow.*

Aphel, *afterwards.*

Timi, *yesterday.*

Ádápráng, *early in the morning.*

Bibiso, *by degrees.*

Ánuethu, *in the evening.*

Láhe láhe, *slowly.*

Árnithu, *always.*

Dámsrak, *quickly.*

Mini, *to-day.*

SENTENCES.

Náng men mpó? *what is your name?*

Ne men ge Dómái, *my name (is) Domai.*

Náng bozáriyok dám lági, *you must go to the bazar.*

Náng ásipini mpot káugholo? *what have you done all day?*

Náng gethek po mpiyok thánthe? *if you know why do you not speak?*

Ne ekotáh thánthe iong ngo, *I did not utter a single word.*

Hem kikemáyok kopho lángno, *look for bamboos to build a house.*

Náng tirklong, ne tirklong kiding, *my spear is longer than yours.*

Wó wókák prege bi, *put the fowls and ducks apart.*

Iáláng-so a-bí áló má ápe? *is this a male or a female goat?*

Ne ngo do náng ne, *do not stand before me.*

Ne mu-áyok tárámo wángye iongó, *I have called my brother, he will not come.*

Áláng thándoh mináp wángye, *he says he will come to-morrow.*

Mináp ádápráng wáng noh, *come early to-morrow morning.*

Iwot árleng ásopenso báng hini, *one man (had) two sons.*

Sopo ápihiso ábitháng á-náng ápó-ayok tháloh, *the younger said to his father.*

Lá á-náng ápó, *O! my father!*

Ne ápó á-dhon á-bhág netá hrong he, *give me the share of my father's wealth that falls to me.*

Áláng ápó lá á bolór ji dhon kádák kiding láprak-e thág loh, *his father then divided between them his wealth and substance.*

Timi timidi nigan hini nigan githom, *after a few days.*

Lá á párá ásopo ámuso jidhion kádák kiding ensi deh sári dámoh, *the younger son taking his wealth and substance departed thence to a far country.*

THE KASSIA.

The tract of mountain territory inhabited by the Kassias borders on Kaehar to the east; the district of Sylhet to the south; the Garo hills to the west; and the valley of Asam to the north. It forms an irregular parallelogram, the length of which, from north to south, may be assumed at about 70 miles, and its average breadth at 50, giving an area of about three thousand five hundred square miles.

The language spoken by the Kassias is very simple both in structure and expression; but it abounds with those intonations that form so striking a feature in the languages allied to the Chinese. The short, abrupt sound at the termination of a word or syllable, is especially frequent. The Kassias are also very lavish of words to express their most common ideas, and often make use of terms very specific in their application. For instance the verb to wash, has no less than six synonymes in this language. Tet, *to wash the hands*; Batá, *to wash the face*; Sleh, *to wash the head*; Sum, *to wash the body*; Kling, *to wash a vessel*; and Sait, *to wash clothes.*

OF NOUNS.

Nouns are of two genders, masculine and feminine, distinguished by their specific prefixes. U, denotes the masculine, and Ká, the feminine.

U tangá, *husband*.

Ká tangá, *wife*.

U hanmen, *elder brother*.

Ká hanmen, *elder sister*.

U párá, *younger brother*.

Ká párá, *younger sister*.

U skei, *buck*.

Ká skei, *doe*.

U klá, *tiger*.

Ká klá, *tigress*.

U Sier, *cock*.

Ká Sier, *hen*.

In a few instances, distinct terms are used to denote the male and female members of a family, as Kapá, *father*; Kami, *mother*. Yet the prefixes are seldom or never omitted.

U kapá, *father*.

Ká kami, *mother*.

U kapáná, *pat. uncle*.

Ká sangkenkha, *pat. aunt*.

U kaní, *mat. uncle*.

Ká kamíná, *mat. aunt*.

The feminine particle Ká, is prefixed to the names of most inanimate objects.

Nouns are the same in both numbers. The plural is distinguished by the use of the prefix Ki, in both masculine and feminine nouns.

U mon, *a man*.

Ki mon, *men*.

Ká sim, *a bird*.

Ki sim, *birds*.

Ká knám, *an arrow*.

Ki knám, *arrows*.

The various relations of nouns, usually termed cases, are represented in Kassia by prepositions.

The Genitive case is denoted by the particle Jong.

Ká karteng jong u mon. *The name of the man.*

Ki baniát jong u klá. *The tiger's teeth.*

When the particle is omitted, the case is indicated by the juxta-position of the two substantives, the *latter* being understood to be in the genitive case.

Ká reng u bláng. *The goat's horn.*

The other cases of Sanskrit nouns are represented by such particles as, Iá, *to*; Ná, *from*; Bád, *with*; Há, or Shá, *in*; Háph, *into*, &c.

OF ADJECTIVES.

Adjectives are generally placed after the nouns they serve to qualify.

U kanná bábhá. *A good child.*

U lúm bájerong. *A high mountain.*

Gradation, without comparison, is usually expressed by the word Eh, *hard*, put after the adjective.

U lúm bájerong eh. *A very high mountain.*

The comparative degree is formed by the word Khám, put before the adjective. And as adjectives, especially if used without a substantive, have generally the particle Bá prefixed, the word khám is usually introduced between the prefix and the adjective.

Bá klain, *strong.*

Bá khám klain, *stronger.*

Bá bhá, *good.*

Bá khám bhá, *better.*

Bájerong, *high or long.*

Bá khám jerong, *longer or higher.*

Ká súm jong ngá ká khám jerong iá ká jong phi, *my spear is longer than yours.*

The language has no definite form for constructing a superlative degree of comparison. The usual mode of expressing it, is by the use of the word Tám, *much*, in conjunction with khám, and placed after the adjective.

Bá klain khám tám, *strongest.*

Bá bhá khám tám, *best.*

Bá jerong khám tám, *longest or highest.*

NUMERALS.

The following is the cardinal series of numbers adopted by the Kassias :—

1. Wei.	13. Kád-lai.
2. Ár.	14. Kád-sáu.
3. Lai.	15. Kád-sán, &c.
4. Sáu.	20. Ár-phon, <i>two decades.</i>
5. Sán.	21. Árphon-wei.
6. Hinriu.	22. Árphon-ár.
7. Hinian.	23. Árphon-lai, &c.
8. Práh.	30. Laipon.
9. Kandái.	40. Sáupon.
10. Shipón or kád, a decade.	50. Sánpon, &c.
11. Kád-wei.	100. Shi-spáh.
12. Kád-ár.	1000. Shi-hájár.

The numerals generally stand before the nouns to which they are joined. Lai ngi, *three days.* Ki kádár mon, *twelve men.*

OF PRONOUNS.

The personal pronouns are Ngá, *I*, M'é, or Phá, *thou*; U, *he*, and Ká, *she*; with their plurals, Ngi, *we*; Phi, *you*; Ki, *they*.

The accidents of *case* are marked by prepositive particles, as in the case of nouns.

The relative pronouns are Ei and Nah, signifying *who*, *which*, and *what*.

They are distinguished according to gender by the particle U, or Ká, prefixed. U ei, or U nah, *who*, masc.: Ká ei, or Ká nah, *who*, fem. The plural form is expressed by the plural prefix Ki, Ki ei, Ki nah.

The same terms are used as Interrogative Pronouns.

The demonstrative pronouns are Tá and Neh, which appear to be used indiscriminately for *this* and *that*. The particles U and Ká, are prefixed to indicate the masculine and feminine, and Ki, to denote the plural.

The indefinite pronouns are Unah unah, *whosoever*. Ká nah ká nah, *whatsoever*, or Kumnah kumnah.

OF VERBS.

There is apparently but one regimen for the conjugation of all Kassia verbs, accomplished by the use of pre-positive particles, and which may be exemplified in the following paradigm.

Rakhi, *laugh*.

INDICATIVE.

Present tense. Ngá rakhi, *I laugh*. N. B. Verbs admit of no variation on account of number or person.

Past tense. Ngá lá rakhi, *I did laugh*.

Perfect tense. Ngá lá láh rakhi, *I have laughed*. The verb Iah, *have*, is sometimes compounded with the verbal root. Thus, Ngá lá iah rakhi, *I have laughed*.

Future tense. This tense is marked by the addition of the letter N to the preceding pronoun.

Ngá n rakhi, *I will laugh*.

A sort of Paulo-post-future, Ngán sá rakhi.

The absence of any definite form for the Imperative Mood is supplied by the use of the present or future tense of the Indicative. Thus; Leit shá ká shnang, *go into the village*.

Hángtá ruh phin íaishang, *and stay there, or literally, there and you will stay.*

The Subjunctive Mood is formed by prefixing Ládá to the usual form of the Indicative. Thus ;

Ládá ngá rakhi, *if I laugh.* Ládá mc rakhi, *if thou laugh.* Ládá u rakhi, *if he laugh, &c.*

The Potential Mood is denoted by the use of the word Láh before the verb.

Ngá lám rakhi, *I can laugh.* Ká lám rakhi, *she can laugh.*

Gerund. Bán rakhi, *to laugh, for the purpose of laughing.*

Participle. Dá rakhi, *laughing.*

Prohibition is indicated by the word Wát, put before the verbal root.

Wát tub, *do not steal.* Wát kháng íá kî, *forbid them not.*

The sound of the letter M, is often used in composition, to express negation.

Ngim lá wállám u kán, *we did not bring the rice.*

Kim tet íá kî kti jong, *they wash not their hands.*

Besides the use of interrogative particles, the only sign to denote interrogation, is the raising of the voice at the end of the question, and giving to the last syllable a lengthened articulation.

U cî u tá? *Who is this?*

Don ai uh pat? *What lack I yet.*

U neh um u kúm jong u? *Is not this his son?*

PARTICLES.

Hábá, *then, at which time.* Handá kumtá, *at that time, when.*
Man, Mannáh, *when, when?*

E'm, *no.*

Hadi in, *last.*

Shishá, *truly.*

Biáng biáng, *diligently.*

Shiwá, *first.*

Conjunctions. Ruh, *and.* Nábá, *for, because.*

Láne, *or* Ládá, *if.*

From the illustrations already furnished and those that follow, it will be observed that the Kassias make use of a large number of insignificant particles, most of which are merely euphonical. Such are Bá, Nah, Té, &c. : in addition to an apparently too prodigal repetition of the pronominal particles Ká and U.

SENTENCES.

¹Khat ²iá ³ngá, ⁴bá ⁵ngá ⁶ruh ⁷ngán ¹leit, ²call ³to ⁴me, ⁵I ⁶and (even) ⁷I shall
go.

¹Tád-lánoh ²ngán ³shong ⁴bad ⁵phi? ¹How ²long ³shall ⁴I ⁵stay with you?

¹Ká ²tári ²jong ³nah ³ká ²neh? ¹whose ³knife ¹is ³this?

¹Ká ²neh ³ká ⁴űng ⁵u ¹kapá ⁴jong ⁵ngá, ¹this ⁴is ⁵my (of me) ³father's ²house.

¹Hangnoh ²me ³shong ⁴manhanin? ¹where ³were ²you ⁴yesterday?

¹Ngá ²lá ³shong ⁴há ¹ká ²klau, ³I ⁴was ¹in ²the ³jungle.

¹Phá ²lá ³bám ¹já? ²have ³you ¹eaten ²rice?

¹U ²lá ³shím ⁴ká ⁵já ⁶ná ⁷kí ⁸kti ⁹jong ¹⁰ngá, ¹u ²lá ³ai ⁴ruh ⁵ia ⁶u ⁷ksen, ⁸he ⁹took ¹⁰the
rice ³from ⁴my (of me) ⁶hand, ⁷and ⁸he ⁹gave ¹⁰it ¹to ²the ³dog.

¹Ká ²m ³kám ⁴shu, ¹she ³does ⁴no ²work.

¹M ²don ³dokhá ⁴há ⁵ká ⁶wáh, ⁷there ⁸are ⁹no ¹⁰fish ¹in ²the ³river.

¹U ²lá ³phá ⁴nah ⁵ia ⁶kí ⁷shá ⁸ká ⁹klau ¹⁰bá, ¹ki ²lá ³leit ⁴nah ⁵ruh, ⁶he ⁷sent (to)
them ⁸into ⁹the ¹⁰jungle, ¹and ²they ³departed.

THE LORD'S PRAYER.

U kapá jong ngi u bá há baneng; long bakúid ká karteng jong mé.
Wán ká hímá jong mé; long ká món jong mé há ká kandeu, kum bá há
baneng; ái iá ngi mantá ká jing tám jong ngi ká bá biáng. Máp ruh iá
ngi ká rang káng jong ngi kum bá ngi máp iá ki bá leh sniu iá ngi.
Wát iálám ruh iá ngi shá ká bá panshoi, hinrei súmer iá ngi ná ká bás-
niu. Nabá ká hímá, ká bor ruh, ká búrom ruh ki jong mé, hálá kartá.
Amen.

The list of Khamti words given in the annexed vocabulary has been
very kindly furnished by the Rev. N. Brown of Sibsagor. For the
Singpho and Námsángiyá Nágá words I am indebted to the kindness of
the Rev. M. Bronson of Nowgong, and for the Kassia, to the Rev. T.
Jones of Charrá-punji.

Comparative Vocabulary, Part II.

English.	Khamti.	Singpho.	Nánsángiyá Nágá.	Mikir.	Kassia.
Above	Kanlü	Ning tsáng	Akhó naug	Athák	Nájerong.
Air	Lóm	Mbúng	Póng	Tomon	
All	Tsanglóng	Yong	Phang tang	A'son	Bároh
Anger	Tsau lüt	Me tsin	Rinklá	Aleng kithi	Ká jing bittár.
Answer	Top khan, Tingkhan	Pai su		Arjula	Táhu.
Ant	Mót	Gágin	Tsi tshák	Miso	Ká dakin.
Arrow	Lím	Pelá	Lát chán	Thál	Ká knám.
Ashes	Tau	Dap	Taplá	Thegho	Ki dapei
Ask	Thám	Sanu	Chye-no	Arju	Kalli
Aunt	Ok. A. (Pat.) Ntsau (Mat.)			Ani (Pat.) Xnu (Mat.)	(Pat.) Ká Sangkenká. (Mat.) Ká kaminá.
Back	Lang	Sing máng	Tam	Anung	Bannán.
Bad	Mauí	Ngat-á	Achí	Ngodáh	Ká Barni.
Bag	Thóng	Mpheng	Khat tóng	Chul	(No generic term.)
Bamboo	Maimó	Kúa	Vá	Chek-kopho	Ká Tukri, Ká Sháng.
Basket	Táng, Móng	Mung	Kuon shí	Pási (Asam)	Ki kapi ing.
Beads	Poi	Kachí	Lik	Lek	U, or Ká Dingim.
Bear (n)	Mí	Tsáp	Sap bá	Thoám-Thogoyám	Niutamoh.
Beard	Nut	Ningpap			Sanpát, Dát, Shak.
Beat	Po	Dúpu	Vá-to	Chakho	Ká Jingtiáh.
Bed	Kú	Laku	Li-áng	Tupchá, Tár	U or Ká Ngáp.
Bee	Phung	Lagát	Ngáyá	Piá-Piú	Pán.
Beg	Fon	Phiá	Chuó	Kichiang	Ká Kapoh.
Belly	Tong	Káu	Vók	Ipok	U Kuá.
Bettlenut	Mák mụ	Támul	Kavé	Kone	U or Ká Sim.
Bird	Nók	Wú	Vó	Wó, Oí	Dáit.
Bite	Káp	Wá-u	Ka-ko	Kor	Bá Katáng.
Bitter	Khóm	Khá	A-khá	Khodák	Bá iong.
Black	Nam	Cháng	An-yak	Akuk	Ká Suam.
Blood	Lüt	Sai	Hé	Awí	Ká Lí ing.
Boat	Hü	Lí	Khu-on-khó	Tilong	Ká Met.
Body	Tó	Khum	Sak	Ibáng	

Bone	Nuk	Aráb	Arape	Ká Shing
Bow (n)	Kóng	Do-ak-háp	Batulu	Ká Ranti
Boy	Lukon	Natá	O-ó, Och	U Kanná
Brass	Tong lung	Pitol, (<i>Asam.</i>)	Pitol	Ká Arnong
Break	Phe, Hák	Ngu-ak sye to	Khánhok	Khein, Kadiáh, Pan-páit, (<i>used specifically.</i>)
Bring	Aumá	Vanró	Wán	Wállán
Broad	Kwáng	Khá dòng	Aráng the	Bá jlán
Brother	Ptsái (<i>elder</i>), Nongt-sái (<i>younger</i>).	Nau (elder), Pú (younger).	Ate (<i>elder</i>), Imú (<i>younger</i>).	(Elder) U Hanmen, (<i>younger</i>) U Hanben, Pará
Buffalo	Khwái	Lé	Chelong, Jáláng	U or Ká Shinreh
Burn	Tsi fai	Thakó	Phi	Ing, Tháng, Phuh, (<i>used specifically.</i>)
Bury	Phang	Binó	Pep	Tep
Call	Hong	Ruó	Táram	Khot
Carry	Sóng	Kapkató	Pon	Kit, Báh, Ráh, &c.
Cat	Miau	Miang	Meng	Miau
Catch	Tseü	Luó	Nep	Kem
Cheek	Kem	Than	Angom, Ikecheng	Ká Ngáp
Child	Luk	Natá	Och	Kunlung
Cuin	Káng	Ká	Abib	Ká Tamoh
Cloth	Phá	Khat	Phe	Ká Ján
Cloud	Kang phá, Mok	Phu am	U Lohoh	U Lohoh
Cold	Yen	Aki	Kángsam	Kréat, Pidjá, Dáitáh
Come	Má	Káro	Oáng	Allá, Wán
Cook (v)	Hung	Puonó	Pámen	Shet (<i>properly to Boil</i>)
Copper	Tong neng	Tám (<i>Asam.</i>)	Tám	Ká Támá
Cow	Ngó	Mán	Chorong	Ká Massí
Crooked	Ngok	Akuang	Keukwan	Kanriáng, Wiát, Dor
Crow (n)	Ká	Vakhá	Wák	Kallán
Cry	Hai	Sapó	Choru	U or Ká Tangáp
Cut (v)	Tet, Khat	Duako	Thu	Iám, Laniár
				Ot

English.	Khamti	Singpho.	Namsangiyá Nágyá.	Mikir.	Kassia.
Dance	Ká	Maná-u	Ru-ó	Ká	Shád
Dark	Napsing	Ning-tsing	Rang-ngyak	Ingting kok	Dum
Daughter	Juk ying	Syá	Dehek chá	Asope	Ká Kun
Day	Wán	Ningthóí	Rang-ngyí	Anerlo	Ká Sngí
Deaf	Hú nók	Ná-phang	Nábá	Kang thong	Kallut
Deep	Lüek	Súng	Alú	Arnúg	Jilin
Die	Tái	Siu	Ri-ó	Thí	Iáp
Dig	Khut	Thú-u	Thu-ó	Thup	Tih
Dog	Má	Guí	Hu	Hi	U Ksen
Drink	Kin nam (<i>eat water</i>)	Lü-u	Jókó	Jun	Dih
Dry (<i>adj.</i>)	Heng	Tsi kro	Chuoklam	Kreng lám, Apreng	Rakiáng
Duck	Pét	Kai pét	Pák-mák	Wo-Kák	Hán
Ear	Ilá	Ná	Ná	Ino, An	Ká Skor
Earth	Nín	Nggá	Ilá	Lángle	Ká Kanteu
East	Wán ok	Ján-prú	Sán-hóng	Ni háng	Mih ngí
Eat	Kin	Sháu	Chá-ó	Cho	Bám
Egg	Khai	Udi	Ati	Oú	Ká Palleng
Elbow	Sok	Latsáng dum	Dak-kú	Eriasek	Ká Tang bait
Elephant	Tsáng	Magui	Puok	Ingvár	U or Ka Hái
Eye	Tá	Mi	Mit	Anek	Ká Kaut
Face	Ná	Mán	Than	Imháng	Ká Kaut
Fall	Tók	Gadúgu	Ijó	Kijáng, Kloh	Ur
Far	Kai	Tsán	Házó	Kázó	Jingái
Fat	Pí	Phún	A tat	Puot	Bá Sngáid
Father	Pó	Wá	Vá	Apo	U Kapá
Fear	Kó	Khritu	Chéó	Phere	Shepting, Khaweit
Feather	Khun	Mun	Nap	Arweng	Ká Sner
Fight	Hit siék	Phen khátu	Kín man nó	Ranching	Iá slat, Iádát, Iápan
Finger	Leú	Jiung	Dak sá	Munso	Ká Shiriáti
Fire	Phai	Wau	Vau	Me	Ká ding
Fish	Pá	Ngá	Ngá	Ok	Ká Dokkhá
Flower	Mok	Sibau	Chóng-pó	Mir	Ká Sintin
Foot	Tin	Lagóng	Dá	Keng	Ká Kaját
Forest	Thán	Mi ling	Ling	Káng lám	Ká Kláubáh

Forget	Lúm	Malápu	Ilakó	Tetenge	Klet
Frog	Khyit	Sú	Lúk	Sarkati, Boklá	Ká Jakoid
Fruit	Mak	Sí	Arí	Athe	Ká Soh
Get	Nai	Lu-u	Ichú-o	Lháng	Ioh
Girl	Kun ying án	Síwí	Dehick chá	Osope	Ká Kunná
Give	Hñ	Yáu	Kó-o	Pi	Ái
Go	Kwá Páí	Wáu	Ká-ó	Dám	Leit
Goat	Pe	Bainam	Kien	Be, Bí	U or Ká Bláng
God	Phnrá	Phrá	Kathak rang	Arn-nám	U Blei
Gold	Kham	Já	Kam	Ser	Ká Kser
Good	Ní	Gajá	Asan	Me	Bá bhá
Goose	Pet han	Kai khán	Hán	Wokák tetungár	(No tern)
Grass	Yá	Tsing	Hing	Non	Ká Phláng
Great	Yau, Lung	Gubá	Adóng	Akethe, Tetungár	Bá káu
Hair	Phum	Kará	Kachó	Chu	U Shnin
Hand	Mü	Letá	Dak	Iri	Ká Kú
Hard	Khyeng	Já	Aché	Káng táng	Eh
Hate	Tsang	Matsátu	Chinyá-ó	Sim	Isi
Have	Mí, Yang	Ngá dai	Itóna	Do	Ioh
He	Mán	Khí	Até	Aláng	U
Head	Hú	Bóng	Khó	Phu	Ká Klí
Hear	Nyin	Nángu	Táto	Áju	Sngou
Here	Thai	Ná-de	Anang	Lándák, Lelang	Háng neh
High	Sung	Tso-de	Achuong	Kártul	Bá jeraug
Hill	Nói	Kanphú bum	Há chónng	Ing long	U Lum
Hog	Mú	Wá	Vak	Phák	U Sniáng
Horn	Khau	Rung	Róng	Anuk	Ká Reng
Horse	Má	Gumráng	Mók	Nochel	U Kalái
Hot	Mai, Hon, Lüt	Káthet	Akham	Kisoh, Chodak	Shit
House	Hün	Ná	Hum	Hem	Ká Ting
Husband	Phó	Lá	Delá	Ápinghán	U Tanga
I	Kau	Ngai	Ngá	Ne	Ngá
Immediately	Tsang, Ngai	Yá	Dókko	Serák rák	Kumneh Kumneh
In	Kan nài	Kátái	Nyu	Arl-lá	Há, Háph
Iron	Lék	Mpri	Ján	Ingchin	U Nár

English.

Khamti.

Singpho.

Namsangiyá Nága.

Kassia.

Ivory	Ngá tsáng	Magui-kóng	Puok pá	Ignár ángi	U Háti ká banyiat
Kill	Khá, Au, tái	Sotu	Rik váto	Pank klák, Chakwó	Paniáp
Kiss	Tsup	Tsupu	Tumo	Mung	Iáloh
Knife	Mit	Ning syi	Mit chá	Nokso, Lokek	Tari
Knee	Hó khau	Laphút	Daku	Keng kung	Kosin
Know	Há	Chéngú	Ijeto	Thék	Tip
Laugh	Khó	Manú	Ngí-ó	Káng nek	Rakhi
Little	On, Lek	Katsi	Aché	Báchne, Lángso	Bá rit
Light (n)	Leng	Ningthoi	Rangvó	Tháng	Ká Báshái
Lightning	Mep, Fá-mep	Mu práp	Kieplá	Cheneng birláng	Ká Leili
Look	I-em	Yún	Syú-ó	Zang	Kamúh
Long	Yáu	Gálá	Aló	A-kiding	Bá jérong
Mad	Sop, Má	Maná	Apá	Ing chám	Lamir
Man	Kun	Singpho	Mi-nyán	Arleng, Pensó	U Man
Many	Nam	Ló	Ajá	Ako-ong	Bun
Mat	Sat, Phok	Penep	Ham	Tár	Ká Shíhá
Medicine	Yá	Sí	Pham	Then kur	Ká Dawái
Milk	Nam lam	Tsu	Ngupo	Chiláng	Ká Dod
Monkey	Ling	Woó	Véh	Kipi	U or Ka Shri
Moon	Lán	Sitá	Dá	Choklo	U Banái
Mother	Me	Ná	Ing-yóng	Aió, Jong	Ká Kami
Mouth	Sup	Ning-gup	Tun	Ang-gho	Ká Shintur
Name	Tsü	Míng	Min	Men	Ká Karteng
Near	Tikauí	Ni	Therkó	Aduug	Najan
Neck	Kho	Du	Bó	Ang phun	Ká Randáng
Nest	Hang	Ning tong	Arip	Akor, Chek	Ká Skum
New	Maü	Ning nán	An-yán	Akini	Bá tamái
Night	Kliim	Sinó	Rang-pan	Anne	Ká Mlet
No	Ntsau	Galai	Má	Long, Ná	Em
Noise	Sing	Gási	Nátbá	Arki	..
North	Nábong	Paiján	Khó	Arkil ? Uttor	Shatei
Nose	Lang	Nádi	Dok-ko	Nokán	Ká Kamut
Now.	Tsang	Yá	Tún thí	Mou	Montá
Oil	Nam man	Namán		Jápug thu	Ká Umpei áng

Old	Kau, Thou	Ningsá, Dinglá	Ató, Téka	Akisár	Tammen, Rim
Open	Pút	Yánu	Jáno	Ungpu	Panáng
Paddy	Khaü pük	Mám	Chá	Sok	U Kabá
Place (v)	W'aj	Dáu	Thieno	Bí	Buh
Plant (v)	Puk	Khaü	Kheto	Eh	Tung
Plough (n)	Thai	Thai	Nángol	Lángol	Ká, Lankor
Pull	Tút	Gángu	Syeta	Uwung	..
Push	Sai	Ganongu	Thuamo	Dol	Niat
Quarrel	Nan, Phit	Ning getu	Manó	Choprong	Iámái
Quickly	Hít kai	Gáláu	Khorók	Sarák	Kloi-kloi
Quietly	Ning	Tsam tsará	..	Pásese	Jájar
Rain	Phun	Maráng	Rang pát	Arwe	U Sláp
Raise	Yó	Pónu	Tuono	Rung	Kantín
Rat	Nú	Yú	Júpu	Phuyu, Phiyu	Ká Knai
Ratan	Wai	Rí	Rí	Pri	U Tri
Rice	Khaní sán	Ngú	Vóng	(Cooked) An, (Un- cooked) Chang	U Kan
Ripe	Súk	Min	Achúm	Men	Láian, Láih
Rise	Luk	Rotn	Chapó	Thur	Ieng
River	Khye nam	Khá	Joan	Lángpi	Ká Wáh
Road	Táng	Lám	Lam	Toár	Ká Lanti
Run	Len	Gagátu	Chuano	Kát	Phet
Salt	Kü	Júm	Súm	Ingti	Ká Mloh
Sand	Sái	Kumsái	Sei	Sángtel	U Shiáp
See	Han	Mu-u	Khéo	Láng	Ioh ih
Seek	Khá	Tám-u	Lámo	Láng tá	Wád
Sell	Kháí	Dúu	Sango	Jor	Die
Short	Lot	Ku tún	Atóon	Thimok, Thisnet	Bá tabián
Shut	Tan, Háp	Láu	Sako	Ngháp	Khang
Silk	Nái	Náiri	..	Pát	(No generic term)
Silver	Ngün	Kum phróng	Ngün	Rupá, Tángá	Ká Rupá
Sing	Mo	Ning tsinu	Séso	Lún	Rínái
Sister	Píying, Nongsáu	Nábá	Ing yáh	Bái	Ká Hanmen, Ká
				(elder), Ingjil	Pára
				(younger), Ni	Shong
Sit	Nang	Dángu	Tóngo		

English.	Khamti.	Singpho.	Namsangiyá Nágá.	Mikir.	Kassia.
Skin	Nang	Phi	Akhuon	Areng	Ká Snep
Sleep	Non, Nap	Yúpu	Júpo	r	Ioh tiáh
Slowly	Loi loi	Chausu	Aré	Láhelá	Mannian
Small	On	Katsí	Áring	Kibi	Bá rit
Smoke	Khon phai	Wankhut	Vankhú	Dhung há	Ká Tedem
Snake	Ngú	La pú	Pá	Phurul	Ká Baseir ?
Son	Luk sáu	Lásyá	Chá	Ásope	U Kun
Soul	Khon, Sai tsau	Manlá	Dá phá	Iting	Ká Mansim
Sour	Sóm	Klirí	Ásí	Thor	Bá jen
South	Pái tsan	Ná hong	Thó-o	Dakhin (Asam.)	Shati
Speak	Wá	Sú-u	Chapo	Thán	Kren
Stand	Sau	Sapu	Mérik	Arjap	Ieng
Star	Náu	Sigan		Choklo lángso (Lit- tle moons).	U Klur
Steal	Lák	Lugú-u	Hú-o	Hu hu	Tuh
Stone	Hin	Nlúng	Lóng	Arlong	Man
Stop	Phá	Khringu	Bamó	Dotáh	(No general term)
Strong	Heng khii	Ning-gún-já	Achán	Apháran	Bá Kláin
Sun	Wan	Ján	Sán	Arui	Ká Sngi
Sword	Náp	Napseng	Dangló	Nok	Ká Wait
Take	Au	Láu	Kapo	En	Shim
Thunder	Nang, Phá nang	Musíá	Ráng mók	Sining kángreng	U Partát
Tiger	Sü	Siróng	Sá	Tike	U Klá
Tobacco	Yá	Yá móm	Vankhu	Dhumá	Ká Dumá
To-morrow	Maphók	Mphóni	Ninap	Mináp	Láshái
Tongue	Lín	Sing let	Tháli	Áde	Ká Tallid
Tooth	Khiiu	Wá	Pá	Acho	Ká Baniát
Tree	Tun	Phun	Bang	Arong	Ká Ding
Village	Mán	Mereng	Ilá	Rong	Ká Shnong
Uncle	Pulung, Mepá	Wádui	Didí	..	(Pat.) U Kapáná, (Mat.) U Kani
Want	Khaii	Ráu	Flamo	Láge	Kwá
War	Sük	Phen	Rún	Rou	Ká Um
Water	Nam	Ncin	Jó	Láng	..

West	Wan tók	Jánsang	Sán yap	Ngpot	Sep ngi
White	Kháu, Phük	Phróng	Apó	Aklók	Bá lih
Wife	Mé	Númsyá	Tang-ngyú	Apiso	Ká Tangá
Wind (n)	Lóm	Mung	Póng	Tomon	Ká Lher
Woman	Phú ying, Kun ying	Númsyá	Dhiek	Arlossó	Ká Kantei
Wood	Thün	Phun	Pan	Teng	Ká Diing
Work	Hit	Munglí	Mo-ot	Chál tiki	Trei, Kám
Year	Pí	Laning	Rangpá	Neng kan	Ká Snem
Yes	Tsü	Raia	Idangá	Oi	Há hoi
Young	Nun	Kunglúng	A'cien	Riso, Ojáng	Lung, Kanrán
One	Nüng	Aimá	Vánthe	Ichi	Wei
Two	Song	Nkhong	Ványí	Hini	Ar
Three	Sám	Masúm	Váram	Kathom	Lai
Four	Sí	Meli	Belí	Phili	Sáu
Five	Há	Mangá	Bangá	Phong	Sán
Six	Hók	Krú	Írók	Thorok	Hinriu
Seven	Tset	Sinit	Íng-it	Thorok-chi	Hinian
Eight	Pet	Macat	Ísat	Ni-rkep	Práh
Nine	Kau	Tsekhú	Íkhú	Chi-rkep	Kondái
Ten	Sip	Sí	Íchi	Kep	Shipón

Aborigines of Southern India.—By B. II. HODGSON, Esq.

To the Secretaries Asiatic Society.

GENTLEMEN,—In prosecution of the steps already taken by me and recorded in our Journal, for obtaining ready and effective means of comparing the affinities of all the various aboriginal races tenanted the whole continent of India, I have now the honour to submit a comparative vocabulary of seven of the Southern tongues. Five of them belong to the cultivated class of these tongues, viz. Tamil, Malayálam, Telúgú, Carnátaca, Túlava; and two to the uncultivated class, viz. Cúrgi and Tódava. The former are given both in the ancient and modern form, and care has been taken to procure the genuine vocables instead of those words of Sanscrit origin which are now so apt to be substituted for them, especially in intercourse with Europeans. I am indebted for these vocabularies to Mr. Walter Elliot of Madras, whose name is a sufficient warrant for their perfect accuracy.

In regard to these cultivated tongues of the south, among which we are led by history and reason to look for the prototype of *all* the aboriginal languages of the continent,* Mr. Elliot observes that the aptitude of the people at present to substitute prákrit words for aboriginal ones is such a stumbling block in the search for affinities as it requires pains and knowledge to avoid; and he instances (among others) the common use of the borrowed word rakta for blood, in lieu of the native term néthar, by which latter alone we are enabled to trace the unquestionable ethnic relationship of the Gónds, (even those north of the Vindhia) with the remote southerners speaking Telúgú, Caunádi and Túlava.

On the subject of the local limits and mutual influence at the present day of the cultivated languages of the south upon each other, Mr. Elliot has the following remarks:—"All the southern dialects become considerably intermixed as they approach each other's limits. Thus the three words for egg used indifferently by the people speaking Canarese, (matté, tetti, gadḍa) are evidently obtained, the first from the Tamulian,

* Journal, No. 197, for November last. The Himálayan languages form an exception to this assumed general prevalence of the Tamulian type of speech. See Journal for December 1847, and December 1848.

matta ; the last, from the Telúgú, gaḍḍa. This intermixture, which is of ordinary occurrence in all cognate tongues, is here promoted specially by extensive colonization of different races, as of the Telúgús into Southern India under the Bijaynagar dynasty, where they still exist as distinct communities—and of the followers of Rámanúja Achárj into Mysore, where they still are to be seen as a separate class speaking Támil in their families, and Carnátaca in public. The Reddies also, an enterprising race of agriculturists, have migrated from their original seats near Rajahmandry, over the whole of Southern India, and even into the Maháráshttra country, where they are considered the most thriving ryots, and are met with as far north as Poona.”*

Of the uncultivated tongues of Southern India Mr. Elliot has been able to procure me on the present occasion only incomplete vocabularies of two, viz. the Cúrgi and Tódava. But further assistance may be looked for from him in regard to this class of tongues, as to which he observes that “ the dialects of the Cúrambers and Irulers and other mountain races of the south are well worth exploring.” I have likewise myself made fresh application to Colonel Low, to our Residents at Baroda and Sattara, and to other parties residing at Gúmsar, the Nilgiris and Ceylon, with a view to completing the comparative vocabulary of all the continental and Insular aboriginal languages ; and to our authorities in Assam and in various parts of the chain of mountains dividing our provinces from those of Ava, in order to obtain the Indo-Chinese series of border languages—all upon one uniform plan.

These shall be hereafter forwarded as received, with such remarks as the study of the whole may suggest.

* For the ordinary and proper locale of the several cultivated tongues of Southern India, see Ellis’ Dissertation and Wilson’s Makenzie Manuscripts. Mr. Elliot speaks in illustration of the general and well known facts of the case.

English.	Tamil		Malayalam.		Telugú.		Carnátaka.		Tuluva.	Cúrgi.	Todava.
	Ancient	Modern.	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.			
Air	Kál	Káttu	..	Káta	..	Gáli	Elaru	Gháli	Gháli	..	Kott
Ant	Uravi	Erumbu	..	Irumba	..	Chíma	..	Irivi	Pijin	..	Erb
Arrow	Kanei	Ambu	..	Amba	..	Ammu	Saralu	Ambu	Biru	..	..
Bird	Pul	Paravei	Parva	Pakki	..	Pitta	..	Hakki	Pakki	Pakki	Pull
Blood	Sennir	Udiram	..	Chora	..	Netturu	Kenniru	Netturu	Nettar	Chore	..
Boat	Pakada	Odam	..	Vanji, or Vallam	..	Padava	Paru	Doni	Oda	..	..
Bone	Enpu	Elumbu	..	Ella	..	Emika	Elume	Eluvu	Elu	..	..
Buffaloe	Káran	Erumei	..	Eruma	..	Enumu	..	Emme	Erme	..	Ir
Cat	Púsei	Púnei	..	Púcheia	..	Pilli	..	Bekku	Puchiche	..	..
Cow	A ; Pettam	Pasu	..	Payya	..	Avu	Avu	Hasuvu, Akalu	Petta	Payyu	Tanna
Crow	Karumpillei	Kakká	..	Kákka	..	Kaki	..	Kági	Khákke	..	Kak
Day	El	Pagal	..	Pagal	..	Pagalu	Pagalu	Hagalu	Pagil	Pogal	Pokhal
Dog	..	Náyi	..	Náya	..	Kukka	..	Náyi	Návi	Náyi	Náyi
Ear	Sevi	Kádu	..	Káda	..	Chevi	..	Kivi, Kimi	Kebi	Kemi	Kavi
Earth	..	Nilam	..	Nilam	..	Pudami	..	Podavi	Nela	..	Nelan
Egg	Sinei	Muttei	..	Mútti	..	Guđu	..	Tatti, or Motte	Mutte, or Teppi	..	Mukshu
Elephant	Kaliru	Áne	..	Ána	..	E'niga	..	Áne	Áne	Áne	Án
Eye	Náttam	Kan	..	Kanna	..	Kannu	..	Kannu	Kann	Kann	Konn
Father	Eudei	Tandei, Tagappan, Appan	..	Achchan	..	Tandri	..	Appa, Tande	Amme	..	Eyyan
Fire	Azhai*	Neruppu	..	Tiyya	..	Nippu	..	Benki, Kechehu	Tu	..	..
Fish	Puzhal	Mín	..	Mín	..	Chépa†	..	Mínu	Mín	..	..

* Zh is employed, according to Mr. Ellis' plan to represent the Tamil like a hard L by Europeans, Muhammadans, and other foreigners—and also by the Pariahs. † Thus azhal would be alal. which has the sound of the French j in jamb, Jacques, &c. but is often pronounced ‡ So written but pronounced Chápa.

Flower	Alar	Pú	Puvva	Puvvu	Puvvu, or Pú	Huvvu	Pu	Puvu
Foot	Kazhal	Adi	Adi	Adugu	Adi	Heje	Hajji	Orri*
Goat	Vellei	Adu	Valladu	Méka	..	Kúdu	Kuri	Adr
Hair	Kuzhal	Mayir	Talamudi	Ventruka	..	Kúdalu	Orama	..
Hand	Tol	Kai	Kayya	Cheyi	Tol	Kai	..	..
Head	Senni	Talei	Tala	Tala	..	Tare	Mande	Kayi
Hog	Kézhal	Panri	Panni	Pandi	Pandi	Panji	Pandi	Mudd
Horn	Kodu	Kombu	Komba	Kommu	..	Kodu, or Kombu	..	..
Horse	Páymá	Kudrei	Kudira	Gurramu	..	Kudure	Kudre	Kadar
House	Illam	Manei, Uidu	Vida, Illam	Illu	..	Kudure	Kudre	Arva
Iron	Karumbon	Irumbu	Irumba	Inumu	..	Mane	..	..
Leaf	Adei	Elei	Ela	Aku	..	Kabbina	Elakand	..
Light	Oli	Velicham	Velicham	Veluturu	..	Ele	..	Err
Man	Makana	Al, see night	Al	..	..	Belaku	Bhoksha	Pelch
Monkey	Kaduvan	Kurangu	Koranga	Koti	..	Alu	Mánu†	Al
Moon	Pirei	Tingal	..	..	..	Kodaga, or Manga	..	Kodan†
Mother	Ínrál	Táyi or Áyi	Amma	Talli	..	Ac Tingalu	Avva	..
Mountain	Varei	Malei	Mala	Konda	Male	Gudda	..	..
Mouth	..	Váyi	Váya	Noru	..	Báyi	Báyi	Pann
Moschito	..	Kosuvu	..	Doma	..	Solle	..	Páyi
Name	..	Pér	Péra	Péru	Pesaru	Hesaru	..	Pér
Night	Al	Íra	Ráv	Réyi	..	Íralu	Íral	..
Oil	Néyam	Ennei	Enna	Núne	..	Enne	Enne	Enn
Plantain	..	Vázhei	Vázha	Araçi	..	Bále	..	..
River	Varupunal	Áru	Puzha	Eru	Pole	Hóle	Pole	Pá
Road	Neri	Vazhi	Vazhi	Dári, Dova	Páde	Hádi	Batte	Morg
Salt	..	Uppu	Uppa	Uppu	..	Uppu	Uppu	Upp
Skin	Adal	Tol	Tola	Tolu	..	Tovalu	Tolu	Torra

† Sansc.

* These words signify footstep rather than foot. The common word for foot in all the S. dialects is Kal.

‡ Macacus radiatus.

§ The common word is *Chandra*, Sansc.

English.	Támil.		Malayálam.		Telugú.		Carnátaka.		Tuluva.	Cúrgi.	Todava.
	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.			
Sky	Vin	Vánam	....	Mánam	....	Minuu	Mugilu, Bán, or Bán	....	....	....	Pone
Snake	Kadsevi	Pámbu	....	Pamba	....	Pánu	Pávu	Hávu	Parapunu	Pamb	Pab
Star	Vin-mín	Vánmín	....	Minganna	....	Chukka	Mínu	Chukki	Daráya	....	Ponémín
Stone	Kan	Kal	....	Kalla	....	Ráyí	....	Kallu	Kalla	....	Kall
Sun	....	Pakalon	....	Súrya (<i>com-mon</i>)	....	Poddu	Pallili	Hottu	Polutu	....	....
Tiger	Pul	Puli	....	Puli	....	Puli	Pali	Hali	Pili	Nari	Pirri
Tooth	Eyiru	Pul	....	Palla	....	Pallu	Pallu	Hallu	Káli	Pall	....
Tree	....	Sedi, Mar-an	....	Chedi, Mar-an	....	Chetlu	....	Gida, Mara	Mara	Mara	Mén
Village	Pekkam	Úr	....	Tara, D'sam	....	Úru	Palli	Halli, Úru	Úru	....	Modd, Mort
Water	Punal	Tanni	....	Vellam	....	Níllu	....	Níru	Nír	Nír	....
Yam	....	Valli*	....	....	....	Nénu	An	Nánu	E'n	Nán	....
I	Yán	Nán	....	Gnán	....	Nívu	Nin	Ninu	I (pronounced as in it)	Nin	One
Thou	....	Ní	....	Ni	....	....	....	....	....	....	Ni
Ile	....	Avan	....	Avan	....	Vádu	Avam	Avanu	Aye	....	....
She	....	Aval	....	Aval	....	Ame	Aval	Avalu	Aval	....	....
It	....	Adu	....	Adu	....	Adi	....	Adu	Av	....	....
We	Akadu	Nám	....	Gnángal, or Nám	....	Ménu	An	Návu	Enklu	Eng	....
Ye	Nivir	Nír	....	Níngal	....	Míru	Nín	Nívu	Inukulu	Níng	Namua
They	....	Avar	....	Avara	....	Váru	Avar	Avaru	Aluku	Avaru	Adám
Mine	....	Enadu	....	Eure	....	Nádi	....	Nannadu	Ennow	....	....
Thine	Ninadu	Ninadu	....	Ninfa	....	Nídi	....	Ninnadu	Innow	....	....
His	....	Avanadu	....	Avare	....	Váddi	....	Avana	Ayanow	....	....

* *Dioscorea alata*, perin valli, Malayálam. D. oppositifolia, avating tígá, Telugú. D. aculeata, seru valli, Tamil; ganusu, Carnátaka. D. pentaphylla, nuran kighang, Tamil and Malayálam.

Our's	Enadu	Namadu	....	Nangade	....	Mádi	....	Namadu	Enkulano	....	....
Your's	Numadu	Umadu	....	Ningade	....	Midi	....	Nimadu	Inkulano	....	....
Their's	....	Avarudu	....	Avarude	....	Váridi	....	Avaradu	Akulunow	....	....
One	....	Onru	....	Onna	....	Vokati	....	Ondu	Onji	....	....
Two	....	Iranđu	....	Renđa	....	Renđu	....	Erađu	Erađ	....	....
Three	....	Múnu	....	Múnnar	....	Múđu	....	Múru	Múji	....	....
Four	....	Nálu	....	Nála	....	Náľu	....	Náľu	Náľu	....	....
Five	Nágu	Anđu	....	Anja	....	Ayidu	....	Ayidu	Ayinu	....	....
Six	Aindu	Aru	....	Ara	....	Aru	....	Aru	Aji	....	....
Seven	E'zhu	E'zhu	....	E'zha	....	E'du	....	E'lu	E'lu	....	....
Eight	Ettu	Ettu	....	Ettu	....	Enimidi	....	Entu	Ename	....	....
Nine	Onbaku-	Onbadu	....	Ombada	....	Tommidi	....	Ombhattu	Orambo	....	....
Ten	du	Patta	....	Patta	....	Padi	....	Hattu	Pattu	....	....
Twenty	Orupaku-	Irupadu	....	Iruvada	....	Iruvai	....	Ippattu	Iro	....	....
Thirty	du	Muppadu	....	Muppada	....	Muppai	....	Muvvattu	Muppo	....	....
Forty	du	Narpadu	....	Náľpada	....	Nalubai	....	Náľvatta	Náľpo	....	....
Fifty	du	Aimbadu	....	Ambada	....	Yáľbai	....	Ayivattu	Ayiva	....	....
A hundred	....	Núru	....	Núra	....	Núru, or Vanda	....	Núru	Núdu	....	....
Of	....	Udaya	....	Ude	....	Yokka	....	Na, or Da	No, or Du	....	....
To	....	Kku	....	Kk, Nn	....	Ku, Ki	....	Ge, or Kke	Ku, or Ge	....	....
From	Il	Ninru	....	Ninna	....	Nunchi	....	Inda, or De-sainda	....	....	....
By	An	Al	....	Al, Ale, Konda	....	Valla	....	Inda	Ath	....	....
With	....	Odu	....	Ode, Kúda	....	To	....	Kúda, or Ottugu	Kude	....	....
Without	Anri	Allámal	....	Illáda, Kú- dáda	....	Tappa	....	Sangada Hortu	Horata	....	....

English.	Támil.		Malayálam.		Telugú		Carnátaka.		Tuluva.	Cúrgi.	Todava.
	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.			
In	Kan	Il	Il	Il	....	Lo	Ol	Olage	Olai idu	....	Ol
On	....	Mél	Mél, Méle	Payini	....	Payini	....	Méle	Mittu	....	....
Now	Ippozha- du	Ippodu	Ippol	Ippudu	....	Ippudu	....	I'ga	Itten	Ikka- lu	Itwan
Then	Appozha- du	Appodu	Appol	Appudu	....	Appudu	....	A'ga	A'pal	Anda	Atwan
When ?	Eppozha- du	Eppodu	Eppol	Eppudu	....	Eppudu	....	Yávaga	E'pag	Ekke	....
To-day	Ittai	Inru	Inna	Nédu	....	Nédu	....	Thottu	Ini	....	Idd
To-morrow	Pinrei	Nálei	Nále	Répu	....	Répu	....	Nále	Eli	Nále	Mockol
Yesterday	Nerunal	Néttu	Innale	Ninna	....	Ninna	....	Neuna	Kode	Nenne	Enner
Here	Ivan	Ingu	Ivide	Ikkada	....	Ikkada	....	illi	Inchi	....	Itt
There	Avan	Angu	Avide	Akkada	....	Akkada	....	Ali	Anchi	....	....
Where	Evan	Engu	Evide	Ekkada	....	Ekkada	....	Eli	Odeke	....	Ett
Above	Misei	Mél	Méle	Payina	....	Payina	....	Méle	Mett	....	....
Below	Kizhak- ku	Kízh	Tázhe	Kinda	....	Kinda	....	Kelage	Sett	....	....
Between	Náppan	Nadu	Nadukke	Nadama	....	Nadama	....	Maduve	Nadu	....	....
Without,	....	Veliyl	Purame, or	Bayifa	....	Bayifa	....	Horage	Pedi	....	Parmutak
outside	....	....	Puratte	....	....	....	....	....	....	....	....
Within	....	Ullil	Agatta	Lopala	....	Lopala	....	Olage	Oli	....	Ullu
Far	Séimei	Tulei	Agale	Davvu	....	Davvu	....	....	....	....	....
Near	Annei	Kitta	Adukke	Dápu	....	Dápu	....	Hattara, or	Khayi, or Tol	....	Kéguri
Little	....	Siriya	Kora	Kásta	....	Kásta	....	Sáre	....	Chennang	....
Much	Mikka	Mikunda	Valara, or	Nindá, or	....	Nindá, or	....	Tusa, or	Onda	....	Uppom
			E'ra	Mikkili	....	Mikkili	....	Thode	Dinj-a	....	....
How much ?	Ettunei	Evalavu	Etra	Enta	....	Enta	....	Bahala	Ett	....	....
As	Kaduppa	Pol	Pole	Vale	....	Vale	Pol	Eshtu	Anchane	....	....
So	....	Appadi	Angine	Atla	....	Atla	....	Iláge	Do	....	....
					....		....	Iláge		Annane	....

Thus How Why	Ennei	Ippadi Eppadi E'n	...	Engine Engine Endna	...	Itlá Etlá E'la	...	Híge Hänge Yatakke, or Yáke	Inchene Jayekk	Innane	Iggas
Yes	...	Am	...	Ade, Uvva	...	Avunu	...	Havudu	And	Akku	...
No	...	Illei	...	Illa	...	Lédu	...	Illa	Idi	Alla	...
(Do) not	...	Véndá	...	Véndá	...	Vaddu	...	Béda	Borri	...	...
And, also	...	Um	...	Um, Num	...	Nui, Nnu	...	U' (added to the end of the words coupled to- gether)	No	...	...
Or	...	Alladu	...	Engil, Adal- la, Allan- gal	...	Léka	...	Adaru	Andala	...	...
This	...	Avanudaya	...	Avande	...	Váni	...	Avana	Ayino	...	...
That	...	Adu	...	Ada	...	Adi	...	Adu, A	Avu	Adu	Ad
Which ?	Yádu	E'du	...	Eda	...	E'di	...	Yáradu	Erno	...	...
What	...	Enna	...	Enda	...	E'mi	...	E'nu	Jána	...	Im
Who ?	Yár	Ar	...	Ara	...	Evaru	...	Yáru	Uvanda	...	...
Any thing	Yádákilum	E'dákilum	...	Yádonnen- gil [rum	...	Edainá	...	Yáradádu	Uvanda	...	...
Any body	Aráyinum	Arákilum	...	Yádarutto- Tinnuga, or	...	Evaraina	...	Yáradaru	....	...	...
Eat	...	Tin	...	Unnuga	...	Tinu	...	Tinnu	Tinupuna	Unn	...
Drink	...	Kuñi	...	Kuñika	...	Tágu	...	Kuñi	Parapuna	...	...
Sleep	...	Tungu	...	Orakkam	...	Tongundu	...	Nidde hogu	Nidri-Idu- puna	...	...
Wake	...	Vizhittuk- kol	...	Onartuga	...	Mélukonu	...	Echchattiru	Echchirigi- dupuna	...	...
Laugh	Naku	Nakai	...	Chirior Chi- rikkuka	...	Navvu	...	Nagu	Telepuna	...	...
Weep	...	Azhu	...	Karaga	...	E'dchu	...	Alu	Alupuna	...	...
Be silent	...	Summáviiru	...	Mudáthiru, or Uriyáda thiru	...	Uriké-Uadu	...	Summage iru	Manipautip- puna	...	...

English.	Támil.		Malayálam.		Telugú.		Carnátaka.		Túlúva.	Cúrgi.	Todava.
	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.	Ancient.	Modern.			
Speak	....	Pésu	....	Paraya, or Samsárik- ka	....	Mátládu	....	Mátládu	Pater puna	Takpare	....
Come	....	Vá	....	Varuga	....	Vachchu	....	Baru	Barapuna	....	....
Go	....	Po	....	Poga	....	Povu	....	Hogu	Popuna	....	....
Stand up	....	Nil	....	Nilka	....	Niluchundu	....	Nintu Kollu	Entuna	....	....
Sit down	Udká	Udkáru	....	Kutturika	....	Kárehundu	....	Kútu Kollu	Kullona	....	....
Move, walk	....	Naða	....	Nadakka, or Elakka	....	Naduchu	....	Nadi	....	....	....
Run	....	Odu	....	Oðuga	....	Parigettu	....	Oðu	Párua	....	....
Give	....	Koðu	....	Koðukka, or Taruga	....	Ichchu	....	Koðu	Koðupuna	Tá	....
Take	Ettukkol	Eðuttukkol	....	Eðukka	....	Puchchuko- nu	....	Tokkolu	....	....	....
Strike	....	Adi	....	Adi, Talla	....	Kottu	....	Hode	....	....	....
Kill	....	Kol	....	Kolla	....	Champu	....	Kollu	....	Kol	....
Bring	Koná	Konðuvá	....	Konðuva	....	Techechu	....	Taru	....	....	....
Take away	Koðupo	Konðupo	....	Konðupo	....	Tisukonipo	....	Oyyu	Konðattu	....	....
Lift up, raise	Mérkol	Eðu	....	Ponðikka	....	Ettu	....	Ettu	popuna	....	....
Here	....	Kél	....	Kéikka	....	Vinu	....	Kélu	Diripana	....	....
Understand	....	Afi	....	Tirichchini- ka	....	Teliyu	....	Tili	....	....	....
Tell, relate	....	Sol	....	Para	....	Cheppu	....	Hélu	Teriyunnu- puna	....	....
Good	....	Nalla	....	Nanna, or Nallada	....	Manchi	....	Olle, or	Panuppuna	Nallad	....
Bad	....	Ketta	....	Chitta	....	Chedda	....	Cheluvu	Eddattano	....	....
Cold	Tanniya	Kalirnda	....	Tanutta	....	Challoni	....	Ketta	Pedikattano	Kuttad	....
Hot	Veyya	Sutta	....	Chúda	....	Véði	....	Tampu	Ch'hali	Kultat	Pille
								Bisi	Sekhe	Bekkel	....

Raw	Pozháda	Pachchei	Pachcha	....	Pachchi	....	Hasi	Paje	Pachehe	....
Ripe	Kaninda	Pazhutta	Pazhutta	....	Mágha	....	Mágha	Paranda	....	....
Sweet	Iniya	Tititita	....	....	Sí	....	Sí	Tipe	Mantat	....
Sour	....	Pulitta	Puli	....	Huli	....	Huli	Puli	....	Pilba
Bitter	....	Kasanda	Kayippa	....	Chédu	....	Khayyi	Khayipe	Kaipal	Kachhatt
Handsome	Azhakána	....	Koutuka-	....	Anda maina	....	Cheluva	Eddattano	....	Narradodi
	Payirpá- [na] Aruvarup- Nérána	....	máya Vashala	....	....	....	Andagéti	Padikettano	....	Odeda
Ugly	Ozhungá- na	....	Nére, Chov- ve	....	Sarigga-Un- de	....	Sariyáda	Sarta	Nére	....
Crooked	Kodiya	....	Valanga	....	Vankara	....	Sotta	Mont	....	....
Black	Kariya	....	Karutta	....	Nalla	....	Kari	Khappa	Kartad	Kapp
White	Veliya	....	Velutta	....	Tella	....	Bile	Bollane	Baltad	Pelpam
Red	Sivanda	....	Choganna	....	Erra	....	Kempu	Kempu	Chondad	....
Green	Pachchei	....	Pochcha	....	Akupachcha	....	Ele hasuru	Pachehe	....	....
Long	Nínda	....	Nínda	....	Nidupu	....	Udda	Udda	....	....
Short	Niliya	....	Kuranna	....	Kuracha	....	Giḍḍa	Kuḍḍya	....	[ragatti
Tall	....	....	....	....	Podugu	....	Udda	....	....	Niraka, Ne-
Short } man	Uyarnda	....	....	....	Paṭṭi	....	Giḍḍa	....	....	Kullol
Small	Kuriya	....	....	....	Chinna	....	Giḍḍa	[kka	....	....
Great	Siriya	....	Chiriya	....	Pedda	....	Sanna, Chi-	Kennu	....	....
Round	Periya	....	Valiya	....	Gundu	....	Doḍḍa	Mallow	....	....
Square	Tiranda	....	Urunda	....	Gundu	....	Gundu	Uruttu	....	....
Flat	Saduram	....	Chadaram	....	Chadaram	....	Chouka	Chouka	....	....
Fat	Tattaiyána	....	Paranna	....	....	....	Chappate	....	....	....
	Kozhuppá- na, or Vá- lappámána	....	Kozhutta	....	Kovvina	....	Kabbida	Thora	....	Pekkam
Thin	Meliya	....	Melinna	....	Palachani	....	Tellaneya	Sabara	....	....
Weariness	Ayarpu	....	Valachal	....	Alupu	....	Danivu	....	....	....
Thirst	Nirvedkei	....	Tanni Keri- chal	....	Dappi	....	Niradike	Bajil	....	Nikhosti
Hunger	Posi	....	Visappa	....	Akali	....	Hasivu	Paduvu	....	....

P. S. In representing the vernacular terms in Roman characters I have followed the received mode of spelling; d, t, with dots under them represent the hard cerebral sounds of these letters which have only one representative with us, as opposed to their soft dental sounds; r among the Todas has a peculiarly harsh and prolonged sound which I have represented by reduplication. The correct sound of the Tamil zh is a deep cerebral enunciation of the French j formed by touching the back of the palate with the tongue. Such a sound is very common in Tibetan and its derivatives, wherein nearly every d and g and ch becomes a harsh zh, as Digarchi pronounced Zhiggatzhi.

A Journal of a trip through the Kohistan of the Jullundhur, undertaken at the close of the year 1847, and commencement of 1848, under the orders of the Supreme Government of India, for the purpose of determining the Geological formation of that District. By W. H. PARISH, 2nd Lieut. Bengal Artillery. Communicated by H. M. ELLIOT, Esq. Secretary to the Government of India.

The plain of the Jullundhur Doab is but scantily wooded. It possesses a high sandy soil which can be rendered very productive by means of extensive irrigation. Its fruits and vegetables are of a superior description, and might be brought to the highest state of perfection by improved culture. The heat of summer is generally moderate, whilst the sharp frosts of its winters are very invigorating to European constitutions. Moreover, the climate all the year round is particularly healthy. The plain of the Doab is somewhat triangular in shape, it being included between the Sutlej and Beas rivers, and the Hoshyarpoor range. Beyond this range lies a country surpassed by none for the fertility of its soil or the beauty of its landscape, and remarkable as a hill country for the facilities of access and intercommunication which it possesses.

2. Four miles to the northward of the large and populous town of Hoshyarpoor is situated the Naree Pass which leads over the Pamrai or Hoshyarpoor range into the Jaswun Dhoon. After entering the ghat the road lies along the bottom of a winding ravine for about five miles and then gradually ascends until it reaches the crest of the range, where, crossing over some table-land, it finally descends and enters the valley at Amb-mota. Just within the entrance of the pass is a well of excellent water, and a never-failing spring is met with about four miles further inward, at a place called Naree. To this spot the first march from Hoshyarpoor is usually made. The village consists of half dozen bunyea's shops, alongside of which is an ample space for a small encampment. It being situated at the bottom of the ravine the heat of the place is very great. The road is sandy and easy for horses. Camels can also travel over this ghat. The general aspect of this outer range of hills is barren and naked, for, with the exception of some scanty jungle in the damper glens, and here and there a sprinkling of stunted cheel (*Pinus longifolia*) hardly any vegetation is to be seen for

the greater part of the year. The little village of Amb-mota is, however completely hidden from sight by trees.

3. From this point to Amb-bagh across the valley, is about six miles. The large village of Ambce is placed on the edge of the Jaswun range, overlooking the valley, and the garden, after which it has been named. This last is a pleasant spot to encamp in; the cypress, the mangoe, the mulberry and other fruit trees forming an agreeable and shady retreat for the traveller. The fruits produced in this garden are of a fine description. It is kept constantly watered by means of a "kool" which conducts the water from an immense distance within the Jaswun range. This kool enables the villagers to cultivate many acres of land which otherwise must have remained unproductive. The great drawback to any extensive cultivation in this valley is the scarcity of water, and the sandy nature of the soil. The Sooran is almost dry during the hot weather, and the little water there is usually in it cannot be used for irrigation, as it already flows along the lowest level. It is a great pity that so noble a valley should be under such a disadvantage. The same objection obtains against the table-lands on the surrounding hills. These lands can now produce but one crop a year, whereas they could easily yield three under more favorable circumstances. The only crops I had as yet seen in these hills were the cotton, sugar-cane, motee (*trigonella*?) bajra, (*Panicum specatum* of Rox.) and a vegetable like a very large radish, called I believe moolee, (*Raphanus sativus*?). The grain crops had been sown and were just springing above ground. I left Hooshyarpoor on the 26th October, 1847.

4. Cheenee ghat is about 14 miles east south-eastward of Hooshyarpoor. The intermediate country is prettily wooded with mangoe topes, and intersected by numerous deep gullics which drain off the water from the hills. The entrance to the pass is any thing but tempting; not a tree nor a shrub is to be seen until the traveller nearly reaches the crest. As at the other ghat the road first runs along the bottom of a ravine and then ascends, and passing over the summit descends as rapidly again into the valley at Isapore. The ravine is much narrower and more tortuous, the ascent and descent are also more abrupt, and consequently more difficult than those in the Naree ghat. This one moreover, lies out of the direct route to the interior, which circumstance, combined with the other objections, have prevented any extended traffic

being carried on by this thoroughfare. The village of Isapore is situated in a wooded dell formed by two spurs projecting into the Jaswun Dhoon. From this spot may be seen to the eastward and across the valley, the high ridge of Kotlehr, with the detached forts on its summit; from Isapore to Amb-bagh is about 15 miles, which allowing 7 for the pass, makes the total distance from Hoshyarpoor to the last named village at least 35 miles, whereas by the former route it cannot be more than 22 miles; although my distances are mere guesses, they will not be found very far out, as I have had a good deal of practice to assist me in judging of distances from place to place. My constant habit of noting down the supposed number of miles and the time occupied in going over them has enabled me to calculate with tolerable accuracy the lengths of marches. From the road to Amb-bagh but few villages are visible, from their being generally built on the slopes of the hills on either side of the valley. Within a mile of the garden is a small jungle of dawk (*Butea pindosa*), which being in full blossom when I passed through it in April last added much to the beauty of the scenery by its crimson flowers.

5. The third march is to Kulao-ke-hutta, distant about 12 miles. There is but little difference between the Rajpore ghat and the others. It is however more elevated and the slopes of the ravine are better wooded and consequently more picturesque than either of the former. The ravine leading up to the summit of the ghat is also much wider, but for two or three miles is covered with boulders, which makes it a painful journey for beasts of burden. The descent is sudden and steep, and the road is shockingly stony. About half way stands a handsome gateway on the edge of the khud, and looking down into it. This is the remains of the old fort of Rajpore, which once commanded that pass. Behind the gateway is a considerable village, apparently in a flourishing condition. Kulao-ke-hutta, consisting of a few bunnas' shops, is situated within the angle formed by the junction of two torrent beds descending to the Beas. All around is a dense jungle, which I am told, is full of game. On the several occasions that I have had to encamp there the surrounding woods appeared to be alive with jungle fowls which kept up an incessant cawing.

6. The next march is to Joala Mukhi. At first the road passes over the spur on the left hand (or the northern one) descending afterwards into

the stony bed of a nullah, when it ascends the second spur, along which it continues until it reaches the river. From the right bank the direct road across the Joala valley is over an undulating country, and in parts bad for horses, but the road to the right or more southern one is as flat and as good as the queen's highway in England. The distance from the ferry to Joala Mukhi is good six miles. The march is a pleasant one, the scenery being agreeably diversified by woods and stream, hills and valley, with here and there picturesque hamlets and villages embosomed in trees. One mile from the river, on its left bank, is a considerable village (with a large tank in the centre) the name of which I did not note down at the time, and have since forgotten it. The lofty peepul trees growing in and about that village are usually covered with a large species of bat (*Galeopithecus volans*?) or flying fox, as they are often called. I tried on several occasions to obtain one but never succeeded. A boat and ferrymen are kept at the ghat to convey over the river men and baggage. The boats used on the Beas are similar to those used on the Sutlej. A Sutlej boat is an oblong platform having three of its sides raised two feet high, and the fourth, or stern projected up into a peak some six feet or more above the water. I cannot compare these singularly constructed sterns to anything else but the sharp points of native shoes, to which the curved ends are about as useful and ornamental as the elevated sterns are to the boats. The Beas at the ferry is very deep and from 50 to 60 yards wide, but its waters scarcely cover a fourth part of the bed they occupy during the rains, for then it cannot be less than a quarter of a mile wide. On my way to the ghat in October, I passed through some fields of "Sunn" (*Cutalaria jimcea*) which the villagers were then cutting. The cotton was also being gathered.

7. From Kulao-ke-hutta there is a road or rather beaten track to Nadoun, which follows the course of the river. Our unfortunate countryman, Mr. Moorcroft, travelled by this route when proceeding to Shujanpoor Jira. This one diverges from the former road about a mile from Kulao-ke-hutta, and continues along the crest of the first spur until its termination at the Beas, where it descends into the valley at Kolehsan ghat. Thence it proceeds along the left bank of the river to Nadoun. There are no boats kept at that ghat. The Beas, throughout its course in the Joala valley, presents broad sheets of water broken

here and there by falls. The spurs of the Jaswun range are in general well covered with low bush jungle, in the midst of which are many hamlets. The distance is about 10 miles, but the better way of getting to the last named place is by crossing the river at Chumba ghat and then proceeding directly to Nadoun. The highest point of the Hooshyarpoor range does not exceed 2,200 feet, and that of the Jaswun range 2700 feet above the sea. The elevation of the Joala ridge may be as great as 3,000 feet.

8. That portion of the Joala valley immediately adjoining the holy city is known by the local name of "Belear Dhoon." It is fertile and well cultivated. The town of Joala-mukhi is large and straggling, and is built at the base of the western slope of the Joala-mukhi or Chungar-ke-dhar. The town, with the wooded slopes of the Chungar forming the back ground, and the valley spread out before it, has a very picturesque appearance from a distance. There is nothing interesting, however about the town, it being filthily dirty and badly built. Even the celebrated temple itself is not free from its share of all manner of filth. It possesses no architectural beauty nor any thing worthy of notice, excepting the natural jets of gas. As in all other holy cities, so it is in Joala-jee, prayers and monkeys, sacrifices and debaucheries, priests and bulls go hand in hand. Judging from their conduct at their holy cities one cannot say much in favor of the "mild Hindu!" However, in all parts of the world there is not a view of human nature which is not sufficient to blight the seeds of pride! Through the town and up the range is an excellent flight of steps about two miles in length and leading up to a ghat at the summit. To the left, on a peak somewhat higher, is a neat little fort built of sandstone. This was erected by the Sikhs with an eye to plundering the temple below whenever an opportunity occurred, and it was supposed the priests had amassed a considerable amount of wealth. An extensive view of the Joala and Kangra valleys and of the Chumba range is obtained from this elevated spot. This range furnishes excellent sandstone for building purposes. Nearly the whole town is built of this material. There is a cool burra-duree outside the town open for the reception of travellers. In the "Report" on the Kohistan of the Jullundhur,* I hinted at the probability of iodine being found in the saline springs below the temple; I have since learnt that it is not an uncommon ingredient in such springs.

* Vide Journal of the Asiatic Society of Bengal, April 1848, page 285.

The numerous lime springs, as well as masses of rock salt which are contained in the red marl seems to offer additional proofs of the marine origin of these deposits, since Dr. Daubeny has shewn that in many of these saline sources there is an admixture of iodine, a principle which is confined to the sea, and its productions. This argument is not however to be considered decisive, but only as forming a portion of cumulative evidence, which taken in conjunction with that of the remains occurring in the deposits of this age on the continent, fortifies the conclusion that the saliferous marls are of marine origin, for it might be said that iodine and chloride of sodium have been derived in the first instance from the interior of the earth, and that the ocean may have owed its saltiness to beds of rock salt, as well as that rock salt owed its origin to the evaporation of sea water.”*

9. The next march to Ranee-ke-talao, is about 14 miles in length, and the country is very pretty. The road passes through several villages, where many a rustic lane, shaded by trees, and enclosed by hedge rows, fragrant with the wild rose, the honeysuckle and violets, greets the English traveller and makes him sigh for the land in which every village has its own “love lane!” The road proceeds north-westward along the base of the Joala range until the latter has so much decreased in height as hardly to be distinguishable from the lower hills, when it turns suddenly to the north-east and passing over a low gap enters a small dell in which the tents are generally pitched. The village stands on the flattened crest of a short spur from the Joala range, and is about 300 feet above the encamping ground, which is situated in a quiet sequestered nook.

10. Passing through the village of Ranee-ke-talao the road descends to the bed of the stream which flows under the walls of Kangra and re-ascends on to some table-land. Four miles more of tolerably level road brings you to the thriving village of Dowlutpoor, thence, however, the road rises considerably and afterwards descends as rapidly to the level of the stream, crossed shortly after leaving the last encampment. The bed of this stream is some 200 feet below the town of Kangra. A steep flight of steps leads to the fort gateway on the one hand and into the town on the other. The length of this march is about 10 miles. A road direct from Chumba ghat to Ranee-ke-talao, is a desideratum, as it would shorten the distance by five miles.

* Vide Murchison's Silurian system.

11. The fort of Kangra is built on a piece of land between two mountain streams* which unite shortly after flowing past it. It consists of bastion upon bastion and wall within wall, and has been built after no particular plan or model, but at various times. The outer wall is two miles or more in circumference. The summit of the citadel must be fully 500 feet above the level of the stream which flows underneath. It is sadly out of repair and must soon fall to pieces. The ancient portions of this stronghold are built with sandstone, compact and fine grained, but the modern additions have been made with burnt bricks. With a stout-hearted garrison inside it would be almost impossible to take the place by storm, but as the whole of the interior is commanded by the surrounding heights, the garrison could be shelled out. By order of Lord Hardinge a single *eighteen pounder* has been left there, to which the silly mountaineers make propitiatory offerings. The fort is garrisoned by the 2d or Hill regiment of Sikh Local Infantry, under the command of three European Officers and a noncommissioned officer ; there is also an European Apothecary attached. The Regiment is 800 strong, divided into 10 Companies of 80 men each. The officers are selected from the Regiments of the line, and consist of a commandant, a 2d in command, an Adjutant and Quarter-Master, and a Serjeant Major. Within the fort are the remains of Hindu temples which are covered with elegant sculptures. One of them is much celebrated and is annually visited by hundreds of pilgrims. Both the town and the fort of Kangra are built upon an indurated calcareous conglomerate. The former contains between five and six thousand inhabitants. A short mile from this town is the still more populous one of Bhawun, built on the north-western slope of a hill called Múlkérá. Between the latter and the base of the Chumba range, distant about six miles in a direct line, lies the picturesque and fertile Pergunnah of Kangra ; most of the houses in the towns have roofs slated with slabs of micaceous clay-slate. The streets are narrow, and generally dirty, and are seldom anything better than flights of steps paved with boulders which have become so polished by constant friction as greatly to increase the difficulties of walking, but this very circumstance makes them the more agreeable to persons without shoes. In the centre of Bhawun is a neat Hindu temple with a gilded dome, which enhances the pleasant appearance of the town from a distance. The two modern

* The principal one is called the Ban Gunga, which flows on the south-east.

houses lately built on the summit of Múlkérá hill have any thing but improved the look of the place. The entire management of this vast district of Kangra, extending from the Ravee, where it enters the plains to Spiti, is under the control of two Civilians, a Deputy and an Assistant Commissioner !

12. The view from the top of the gateway on Múlkérá hill is very fine. Immediately below lies a level valley divided by deep torrent beds, and subdivided into fields, each set of the latter having its own hamlet in the centre, embosomed in trees. Rising out of the valley, and to the north appears the fort of Rilloo, peeping out of a dense forest of pines (*P. longifolia*). To the south-east a low wooded range with a fort* on its highest peak shuts out the elevated plain of Pullum. Straight before you, rising aloft, are the rugged peaks of Chumba, topped with snow. Lower down the range a dark belt marks the limits of a long extended forest,† below which again are extensive woods of oaks and rhododendrons, and lowest of all sloping into the valley, lies the noble plain of Dhurmsala, with here and there a village shaded by the graceful bamboo or umbrageous mangoe tree. Again, on turning one's back to this charming scenery another equally as novel is spread out before you. The fort and town of Kangra, the village of Doulutpore, and little Hindu temples perched on conspicuous peaks first attract your notice ; beyond these are seen the Joala range, with the faint outline of the Jaswun stretching out in the dim distance, and lastly to the westward is a complete chaos of low hills intersected by countless ravines.

13. To the south-eastward of Bhawun is a very singular natural archway of conglomerate ; its span, 3 feet above the ground, is 23 feet, height 15 feet, and the solid mass above the arch, the crown, is from 3 to 4 feet high, and from 2 to 3 feet thick, but this portion I was unable to reach for the purpose of exact measurement. This interesting object was discovered whilst strolling about one day in January 1847. Passing through the town of Bhawun I went through a few fields and came upon a plot of uncultivated ground strewed over with rubbish and the traditionary sight of one of Aurungzebe's palaces.

* Pullum Puthan.

† The *Pinus Webbiana*, Horse Chesnut and Walnut trees are found in this forest, but no *Deodons*.

There numerous springs issue from the ground, and flowing down various fissures finally reach one of the streams which encircle the fort of Kangra. The bráhmans, who always select spots for their temples in some way or another favored by nature, in order I suppose to increase the sanctity of their idolatrous religion, have chosen one of the springs and endowed its waters with certain efficacious principles. This little brook, after working its way through several tanks, at last falls into a deep hole, which it has worn away for itself, escaping at last under the archway after a fall of about 25 feet. Entering from below, that place has the appearance of a large cavern with a considerable body of water falling from above. The constant force of the water has washed away the entire roof, leaving the arch standing out by itself some three feet beyond the rest of the conglomerate as a curious monument of the power of water when unremittingly exerted for several ages. On the top of it is built a paltry little temple with a bridge and staircase leading up to it. There are numerous other temples scattered about, and one is perched on the top of a precipice close by. Between this spot and the other is another deep fissure likewise worn away by a limpid stream. Near to where the water descends is a dripping spring, which oozing through the conglomerate, forms stalactites and encrusts every thing within its reach. There is also a similar spring three miles on the opposite side of Bhawun. Immediately under the former one is a large block of quartz crumbling away under its destructive influence, but whilst the solid rock is yielding to the corrosive power of that spring, a delicate little fern drinking deep of its waters flourishes and grows luxuriantly. I believe the latter to be a species of *adiantum*. I have sent specimens of it with the rest of the plants forwarded to Calcutta in April last.

14. There are many pleasant rides and walks about Kangra. Dhurm-sala is a pleasant resort. That plain is about nine miles distant, and the intermediate country is prettily wooded with clusters of bamboo, topes of mangoe, peepul and other trees, with here and there a stately palm. Leaving the lower valley, the road ascends into the plain at its south-western extremity. It is an extensive grassy plateau sloping up rapidly towards the snowy range. The sunken bed of a torrent separates it on one side from the adjacent lowland, and a low ridge covered with small Cheels* bounds it on the other. Its extreme length

* Cheels, *Pinus longifolia*.

is about $1\frac{1}{2}$ mile, with a breadth varying from 150 yards to 600 yards. The highest end has been calculated to be about 4700 feet above the sea. The soil is alluvial, having a covering of six inches of vegetable mould. It was pronounced favorable for the cultivation of the tea plant by Dr. Jameson, and has been selected by him for that purpose. Although the fall in its slope is great, it nevertheless can be irrigated with the greatest facility by means of two Kulus* of water which have been conducted from the snows by the Puharees.† The greater part is at present uncultivated. At the head or highest part are a few blacksmiths' huts. They obtain the iron which they use from the ferruginous sandstone found in the neighbourhood. Further up is another cluster of huts with an orchard or two, and in one of them, amongst other fruit trees, such as the Apricot and Cherry, &c. I met with two or three plantains apparently thriving, although exposed to the cold nights of January at an elevation of 5,400 feet. That plantains can survive the effects of frosts and snow I have lately had indisputable proofs. On the 2nd February 1847, snow descended and continued falling for one hour and twenty minutes, which ultimately covered the valley and the surrounding hills to the depth of an inch. My Fahrenheit's Thermometer fell to two degrees below the freezing point during the night, and did not commence re-ascending until one hour after sunrise on the following morning. Several times both before and after this trying night we experienced very severe frosts. Now in and about the valley, are the mangoe, bamboo, a species of palm, peepul, banian and the plantain, every one of which survived the severity of the weather. Moreover adjoining the plain of Dhurmsala and near the road leading to it is a slightly elevated ridge, along the crest of which may be seen several old peepul trees and clumps of bamboos. On that ridge snow usually falls about once a year to the depth of four inches or more, so that those ancient trees must have withstood the rigors of many a stormy winter. Again, on the 2nd of February of this year (1848) a heavier fall occurred, and the snow remained on the ground much longer than in the preceding one. I happened to be at that time at Shajanpoor Tira, where near the summit of an exposed hill is a garden‡ adjoining the palace of the great Samsar Chund, and contain-

* "Kool," a Conduit.

† Puharees, Mountaineers.

‡ An approximation, which may be 100 feet more or less than the truth, gives it an elevation of 3000 feet.

ing a large number of plantains. At sunrise the next morning, after the fall I went to examine how they had fared, I found their fronds covered with frozen snow and drooping under its weight, but in the afternoon when I visited them again I found that they had regained their natural position, and shewed no signs of having suffered from the cold. We had also some severe frosty weather afterwards which affected them but slightly. The severe weather in these hills is generally ushered in by storms of wind and rain. This is accompanied with an abundance of thunder and lightning, with showers of hail, which ultimately descends in flakes of snow. It commences pretty regularly about the end of January in each year. Besides torrents of rain during the wet season, and a sufficiency in January, slight showers fall in each month, which circumstance must be attributed to the proximity of lofty mountains having an elevation of 16,000 feet. But we must now return from this digression and proceed with the journal. Above the village of Dhurmsala, and at an elevation of 7200 feet above the sea, the Commissioner of Jullundhur has built a house on a spur of the Chumba range, and in the midst of a forest of oaks and rhododendrons. The view thence is magnificent; clay-slate and limestone form the middle, whilst saliferous sandstone and marls form the lower, and granite the highest, portions of the Chumba range.

15. Lug, another place to which sportsmen are fond of resorting, is situated immediately above Killoo, and between 7 and 8000 feet above the sea. It is the name of a hamlet, above which is a level area of one or two acres in extent. Between this and the snowy range is a deep wooded dell in which the menal and argus pheasants abound. But all over the Chumba range game of every description is plentiful; numbers of fine large mahseer and other fish are found in the deep pools which exist in most of the mountain torrents crossing the valley. These streams are fed entirely by rains and melted snow. The longest mahseer was caught under the walls of Kangra, and weighed 28 lbs. I believe. There is a large forest of fine Cheels around Killoo and elsewhere along the base of the snowy range. Killoo is the name of a village with a fort, and is about 10 miles to the north of Chawun.

16. It is also about 10 miles to the village of Shahpoor, the usual halting place after the first march from Kangra toward Noorpoor. Excepting at the stony beds of nullahs, of which there are several, the

rest of the road is tolerably level and good. About another 10 miles brings you to Kotila (or Koteleh). The road is not so good as on the former march. The fort at this place is of the same style as the one at Kangra, but not nearly so strong. It possesses all its disadvantages only in a much greater degree. It is likewise built on a conglomerate rock. One company under a native commissioned Officer of the 2d Sikh Regiment has charge of it. The fort is raised about 200 feet above the level of two streams, which unite under its walls. Within this angle and at the bottom of the ravine is placed the large village of the same name. About a couple of miles before one arrives at that place the road passes through the village of Jhullugnath, inhabited by Cashmírís, who are employed in the manufacture of shawls. Close by there is a large forest of oaks in which I noticed several instances of the peepul growing out of the oak.

17. Noorpoor is about 12 miles from Kotila, and is the largest town in the Kohistan of the Jhullundhur. The other large towns are Kangrá, Bhuwun, Joala, Monkhee, Shajanpoor, Tira, and Mundinuggur. Next to these come Nadoun, Sookeyt and Sultanpoor. Noorpoor contains about 10,000 inhabitants, principally Cashmírís, whose chief employment is in the manufacture of shawls. Working from sunrise to sunset, with only one hour's relaxation, they earn but $\frac{1}{2}$ anna a day each; boys from 6 to 8 years are employed as well as men. The method of manufacturing shawls has often been minutely described and therefore it is needless for me to do so in this place. The fort looks more like a dilapidated Serai than any thing else. Two companies of native infantry under a Captain, from one of the regiments of the line stationed at Cajepore, occupy it. The town and fort are built on a tongue of land formed by a considerable nullah making a broad sweep. This stream flows a hundred feet or more below them in a narrow and tortuous ravine. For eight months of the year it is nearly dry. The town covers a considerable space but the streets are narrow, and dirty and the inhabitants squalid and miserable. The whole is overlooked by high hills. A fort, the name of which I forgot to note down, is perched on a conical peak bearing nearly due north. The country round Noorpoor is very hilly, and the road between it and Kotila is decidedly bad. Before the road reaches the former place it passes through a small undulating valley which is not distinguished by any particular name that

I could learn. The young rajah of Noorpoor, an interesting little fellow, is allowed 5000 Co.'s Rs. a year by Government, which is the total amount of his income, as I believe he possesses no jaghir.

18. Soolahlee is about 12 miles further to the north-westward. It is a thriving and neat village, entirely buried in trees and situated in a small but picturesque valley; Dhurr or Dharr, a hamlet some three miles to the north-west of the former, is inhabited chiefly by blacksmiths, who obtain the iron they work from an adjoining wooded hill. From that spot to the Ravee is a rugged hilly country, and the road is bad.

19. From Noorpoor to Puthankot (or Patan Kot), is fully 14 miles. The road lies along the stony bed of the nullah which flows under the former. Puthankot is built on the line of junction between the hills and the plains, where the spurs of the former gradually lessening in height, are lost in the latter. From Roopur on the Sutlej, to Cajeepoor on the Beas, is a long range of hills (the Hooshearpoor) presenting precipitous slopes to the plains; but between the latter and Pathunkot and even beyond, the hills throw out numerous spurs which abut into the plains. At this place is a small fort and a mangoe tope to encamp in. The town did not appear either large or flourishing. A fine view of a portion of the Chumba range is obtained hence. That part seen through a gap in the lower and intermediate hills must be removed a considerable distance from the plains, as it retains its snow when that near Kangra is quite bare. Its crest also appears more deeply serrated than that of the latter. The boundary in this direction of the British territory is marked by the Hosali canal, which is drawn from the Ravee at the foot of the hills near Sadhori and flows past both Umritsur and Lahore.* It is crossed by a small bridge soon after leaving Patan Kot.

20. The populous town of Adeenuggur is about 12 miles from the last named place, and on the high road to Umritsur and Lahore. From the canal the water is conducted in numberless rills to irrigate the surrounding country. In consequence of this system of irrigation the road is bad, as the deep ruts in which the water is made to flow traverse it in various directions, and not unfrequently overflow on to the road. A

* I am indebted for the above information, to Captain A. Cunningham of the Bengal Engineers.

short distance from the town are the ruins of a palace built on the right bank of the canal, over which a bridge has been thrown to connect the opposite portions of the domain. The buildings are rapidly falling into ruins, but the dense groves of mango trees still remain, and afford evident signs of former magnificence. Distant about 8 miles is an extensive swamp (jeel) which abounds with waterfowl and fish. It belongs to one of the numberless Sings of Lahore. Adinahnuggur was built or named by Adinah Beg towards the end of the last century. He was the Fojdar or Military Commandant of Jalandhar.*

21. Twelve miles E. S. E. of Adinanuggur is Andoorah, the former place being south-west of Noorpoor. It is a large village built on a hillock composed of compact sand, of which kind there are several in the neighbourhood. It is situated within the British territory—a small stream, which flows into the Beas below Hajeepoor making the boundary. I saw nothing worthy of notice at this place.

22. To Juck-o-burr is a march of 15 miles. It is situated just within the hills. In this neighbourhood the general appearance of the low sandstone hills as one approaches them is cheerless and inhospitable. No verdure clothes their naked flanks, and the long coarse grass which covers their slopes looks scorched and dead. The adjoining plain country is also any thing but pretty, the soil being sandy and almost destitute of trees. The road however is tolerably good, and passes through several villages. I travelled along it towards the close of November last. Juck-o-burr is a small village situated in the mouth of a ravine and half a mile from the right bank of the Beas at Rae-ke-puttun. The river between this and Rac on the left bank is divided into two parts by an island. At the abovementioned ghat the force sent against Kangra in May 1846 crossed the river. On the range (Hooshearpoor) behind Rae is a dense bamboo jungle filled with wild boars.

23. A winding ravine, about five miles in length, brings you on to a small piece of table-land on which stands the hamlet of Koonhur, a sweet pretty spot, whence is seen a confused mass of hills and glens bounded to the eastward by the snowy range. Another narrow and tortuous ravine nearly three miles in length, leads on to a similar piece of upland, over which the road passes and descends at Dhumata into

* For this also I am indebted to Captain A. Cunningham.

the Joala valley. A couple of miles south-east of Juck-o-burr, and on the opposite side of the Beas, the Jaswun and Hooshearpoor ranges unite, and throw out a single ridge as far as Hajeepoor, whilst the principal chain keeps a north-westerly direction, after allowing a free passage to the Beas. From the right bank of the river, and from between Dhamata and Juck-o-burr, this sandstone range stretches out in one broad belt towards the north-west, and passing between Noorpoor and Puthankot, reaches the Ravee, beyond which river I suspect that lofty hills of the saliferous formation abut immediately on to the plains. However, that portion of the sandstone range lying between the Beas and the Ravee maintains its usual characteristic features. They consist of strata of compact sand, soft friable sandstone and loose gravel. But the hilly track between Noorpoor and the Chumba range is formed of sandstone and marls with thick conformable beds of calcareous conglomerate indurated into a solid rock. This formation extends also to the Ravee and composes probably a large portion of the territory belonging to the Rajah of Chumba.* This is under the protection of the British Government, to which he pays an annual tribute.

Dhamata is a considerable village on the banks of a dry nullah. It is well wooded. From there a road through Hurreepore leads to Joalamukhi, which is about 25 miles off. The jaghir belonging to the Rajah of Hurreepoor. Golche is a very small village and situated on the right bank of the Beas.

24. Nagrota is likewise a large village built on some rising ground on the left bank of the Guj. It is also situated at the entrance of a ravine which affords a passage from one valley to the other for the Guj that there enters the Joala-mukhi valley. The distance between Nagrota and Dhamata is about 9 miles, which is somewhat more than the width of the valley at this point, as the road crosses it diagonally. The former is tolerably level, and the latter good. Besides the Guj, another considerable stream flows across the valley, into which the former empties itself before reaching the Beas. In May 1846, large quantities of tobacco were growing in the fields, also the Oleander and Cassia fistula were in full blossom, adorning the glens with their red and yellow flowers, as well as scenting the air with their fragrance.

* The saliferous formation of the Kangra district rests on the Silurian, according to Dr. W. Jameson.

Near Nagrota, but on the opposite side of the stream, grow a couple of the largest silk cotton trees (*Bombax heptaphylla*) I have ever seen. The one I measured was 24 feet in girth. There is a banian tree at Juck-o-burr measuring $38\frac{1}{2}$ feet in circumference, but what are these to the noble cypress trees of Mexico, or the still more extraordinary jana trees of Australia, and the locust trees of southern America?*

25. The next march and a half are about the most tiresome that could be imagined. The road lies along the bottom of a deep and serpentine ravine with the Guj flowing through it, which stream has to be forded 51 times before the Kangra valley can be entered!—several of the fords are 3 feet deep, the current is strong, and the bed of the torrent covered with boulders of every possible dimension. Travelled masses of granite too, those stumbling blocks to erratic geologists, are every where scattered about. This ravine is about 13 miles in length and is by no means a safe route to take, as any sudden shower of rain increases considerably the depths of the fords and renders them dangerous, if not impassible. Its average breadth is about 300 yards, but it contracts a good deal in some parts, whilst it widens in others and forms valleys. Some low bush jungle with a few cheels grow on the hills on either side. The dates are well cultivated, whilst here and there the gentler slopes are terraced into fields. The siege train was taken by this route in 1846. Tutti-pani is the usual halting place, and is 9 miles from Nagrota. This spot has derived its name from a hot spring which issued from the hills forming the north-western boundary of the valley. The hills around are composed of strata of sandstone and marls and conformable beds of conglomerate. The length of the valley is about $1\frac{1}{2}$ mile and its breadth a quarter. It is moreover divided into two nearly equal parts by a low spur. The soil at its base is a stiff red clay well suited for brick making. The bráhmans as usual have taken advantage of the hot spring and covered it over with a temple, surrounding the exterior with peepul and other trees. They have also fixed an artificial stone pipe for the jet-d'eau to run through, whilst they collect its tepid waters in a small tank for the purpose of enabling the pious Hindu to bathe in.

* Vide Humbolt's "Personal Narrative," Landor's "Bushman, or Life in a new country," and Lindley's "Vegetable Kingdom."

26. Having wound your way through four miles more of this irksome ravine you enter at last the long wished for valley of Kangra. One mile further is Bunda ghat. This ghat is over a considerable stream which joins the Guj at the mouth of the pass. The town of Bhawun is four miles N. E. of this, and the road is along a level country intersected by three or four deep torrent beds. There is however another route by which a good deal of the unpleasant work of fording may be avoided. This can be done by following the course of a very narrow ravine which turns off to the right about a mile from Puttipani. It brings you out upon a high hill, from which the road descends into the valley along the crest of a spur and joins the other one midway between Bunda ghat and Bhawun. The distance is rather increased by the latter route. There is also a footpath which leads over the hills from Nagrota to Kangra, but I have never travelled along it. In a village not far from Bunda ghat, and looking down on to the Guj, I saw a bair tree (*Zizyphus jujuba*) measuring $3\frac{1}{2}$ feet round, which appeared to me of rather an unusual size.

27. Having arrived at the point from which I started, and not wishing to go over the same ground twice, I will make a fresh start from Joala-mukhi. Kotlair and the former place lie nearly due north and south of each other and about 25 miles apart. I purpose describing this route in the first instance, and afterwards that through Muhulmooree and Sookeyt to Mundi-nuggur.

28. From Joala-mukhi to the Beas opposite Nadoun, is 9 miles. The road is level and good. Nadoun can hardly be called any thing more than a small town or large village, although the numerous Hindu temples, and extensive ruins, remind one of its former greatness. It is built on the left bank of the river and rather more than 100 feet above it, but the opposite bank is very low, and shelving. A fine flight of steps, made of sandstone, leads down to the water, which here presents a wide unruffled surface. Its width is probably 150 yards, and the current is barely perceptible, although its average rate cannot be less than four miles an hour. The latter of course varies according to the season. In the shallows shoals of fish may be seen basking in the sun. There are plenty of fine trees in and about the town, and the country around is decidedly pretty. There is an old saying "whoever comes to Nadoun who would wish to leave it?" which might have

been true in the days of its prosperity, but I cannot say that the place now holds out any particular inducements to take up one's residence there. I had with me both Mr. Moorcroft's and Mr. Vigne's travels, and was much struck with the general accuracy of the former, but I cannot say as much for that of the latter, for whose inaccuracy I can only account by supposing that he did not make sufficiently ample notes on the spot, but trusted too much to his memory. Of course I can only speak of that portion of Mr. Vigne's work which relates to this Kohistan.* Jodbeer Chund, the Rajah of Nadoun, is a tall, stout and handsome man. He is the natural son of the great Sansar Chund, the late Rajah of Cotoche. His jaghir is worth 32,000 a year. He has a nice house situated on the banks of the river, and about a mile from the town. Near the house is a Changan,† on which in former times hockey on horseback used to be played. From Nadoun are three roads leading to as many different places. The principal one is that which passes through Muhulmooree and terminates at the Sutlej opposite Bilaspoor. The next one follows the course of the Beas and enters the Kangra valley at Shujanpoor. Tira,‡ the third one, is the route to Kotlehr.

29. The first march in the last named direction is to Dhanata, a village about 8 miles off. It is built on the north-eastern slope of the Chou-mukhi (or Sola-singha) range, the highest peak of which rises fully 1500 feet above the valleys on either side. Between Nadoun and this place the surface of the Joala valley is very uneven, and intersected by many deep watercourses; the one which we crossed several times on the road is called the Mamke-nuddee. It empties itself into the Beas below Nadoun, whilst the Koonhar, another tortuous stream to the north-eastward of the Mam, does the same above that town. The external configuration of the Pergunnah of Muhulmooree as seen from a height resembles a heavy swell at sea. Dhomata is remarkable for having an excellent stone aqueduct which conducts the water from the range in the rear to the tank within the village. It is about three-fourths of a mile in length, and was built by the present Rajah of Nadoun, in whose jaghir it is situated. I was told that the entire village was destroyed by

* I have since learnt that the gentlemen of the Thibet Mission also found Mr. Moorcroft the more accurate of the two.

† Changan, a level field.

‡ Shujanpoor is 12 miles from Nadoun.

fire in 1846, or a twelvemonth before I visited the place, yet I could discover no traces of the occurrence. Just above where the spring issues which supplies the village with water, immense calcareous blocks are lying about that were probably formed by the agency of some spring in the neighbourhood, but which has now ceased to flow. This leads me to say a few words concerning Captain Newbold's theory of the formation of kunkur.

“The kunkur, as may have been collected from what has been just stated, is not of zoophytic origin, like coral reefs, nor does it appear to have been generally deposited or chemically precipitated from the waters of an ocean or inland lake, but like the travertines of Italy it may be referred to the action of springs, often thermal, charged with carbonic acid, bringing up lime in solution and depositing it, as the temperature of the water gradually lowered in rising to the earth's surface or in parting with their carbonic acid. After depositing a portion of calcareous matter in the fissures of the rocks by which it found a vent, the calcareous water appears to have diffused itself in loose debris, régur, gravels, and clays, usually covering the rocks, and by force of chemical affinity the disseminated particles of lime gradually congregated into the nodular and other forms which we see them assume. These nodules are sometimes arranged in rows like the flints in chalk, and from some of them project delicate spiculæ of carbonate of lime, which would have been broken off had they been drift pebbles, as is supposed by some.”* Of the tufaceous origin of kunkur there can be no doubt; but to my mind the latter part of the above theory, viz. that “by force of chemical affinity disseminated particles of lime gradually congregated into the nodular and other forms,” is anything but satisfactory, and as to the existence of delicate spiculæ being a proof of the masses not having been drifted, I think it insufficient, for by taking a lump and causing water to be slowly filtered through it spiculæ will be formed; the spiculæ in question therefore may have been formed by the agency of rain-water percolating through the bed of kunkur; the chief difficulty however is to account for the nearly universal dispersion over India of the kunkur formation, for as Captain Newbold says, “the kunkur formation is irregularly distributed in overlying patches over perhaps one-eighth of our area. I know of no tract entirely free from it with the exception it is said of the summit of the

* Geology of Southern India, by Captain Newbold.

Nilgiris. I have seen it however at the height of 4000 feet above the sea, among the ranges on the elevated table-lands. It is most abundant in districts penetrated and shattered by basaltic dykes, and where metallic development is greatest, for instance in the copper district of Nellore and the chrome and iron tracts of Salem. It is perhaps least seen in localities where laterite caps hypogene or plutonic rocks." Thus it appears by no means certain or even probable that each bed was formed at the locality in which it is now found, and I believe I am right in saying that a substance analogous to kunkur is now being formed only in the Himalaya. In the Kangra district rounded lumps may be seen scattered about the surface on the table-lands, and hill-sides, as well as in all the ravines, in the same manner as boulders. As there seems no doubt of the bursting of lakes in former times, one would suppose that great quantities of that kind of calcareous matter must have been swept into the plains, and thus extensive beds might have been formed adjacent to the hills.

30. The road leading over the Chow-mukhi ghat is very steep and bad. The fort of the same name is a mile to the south-eastward and somewhat higher. About half a mile beyond this again, and on the opposite side of a gap in the ridge, is the Sola Singha fort perched on the highest peak. The positions of these two forts are very strong, being defended by precipices on three sides, and a sharp rocky ridge on the other, on which it would be difficult to effect a lodgment, but these natural advantages are more than counterbalanced by the absence of water, to obtain which the garrison would have to proceed beyond the protection of their guns. The range on which these forts stand is in parts densely wooded with bamboo jungle. I obtained the following bearings from the summit near the Chow-mukhi :—

Forts Joalo-mukhi and Nadoun,	Due north.
The forts of Kotlehr,	Due south.
Ditto of Kumleh-gurh,	N. E. by E.
Beas visible below Nadoun,	N. N. W.
The range runs	N. W. and S. E.

The views on all sides are both extensive and beautiful. Doongla or Toongla, is about 6 miles from the last halting place. It is a small village prettily situated in the Kotlehr Dhoon. On the slope of the Chow-mukhi range immediately in its rear is a thick bamboo jungle in

which game is said to be plentiful, but I should think it would be next to impossible to get at it.

31. The march across the Dhoon is particularly interesting to the geologist. Its surface presents a singularly disturbed appearance, and at about the middle of the valley the road enters a large basin-shaped hollow where the strata slope outwards with a somewhat *quâ quâ* versal dip. It looks like the remains of an ancient crater, but such I think it could never have been, as I could discover no signs of igneous action. However the whole of this valley deserves a most attentive examination. One principal stream which empties itself into the Sutlej serves to drain the valley. This march is about 10 miles long and terminates at a hamlet, called Dhook. It is situated at the base of the high ridge of Kotlehr, the ascent of which is rendered tolerably easy by a broad pathway made at the order of the rajah who owns the jaghir. The rajah of Kotlehr is an old grey-haired man with nothing peculiar in either his manners or his person. His estate produces him I believe an income of 17000 Rs. a year. On the summit of the Kotlehr ridge is an extensive fortification composed of five detached works. The three principal ones, as well as the forts of Chow-mukhi and Sola-singha, were partly dismantled whilst I was there. From the highest point the views of the Sutlej, of the Jaswun, Sekunder, and Chumba ranges, with the intermediate valleys, are very beautiful. The *pergunnah* of Kotlehr is separated by the Sutlej from Kystore, from that part of it at least which lies within that remarkable bend the Sutlej makes to the north-westward. The saliferous formation crosses the river at that point and passing through Kystore and Subathoo, extends I believe as far as Almorah.

32. From Dhook I travelled north-eastward across the valley and over the Sola-singha range to the hamlet of Bursur. It is built on the north-eastern slope of the range, which is there covered with cheel. Thence also a large forest of* the same stretches out in a northerly direction towards the Joala range. This march is 9 miles long. The road is bad, especially up to the ghat, the ascent to which is very steep for horses. The crest of the pass may be elevated 1000 feet above the valleys on each side.

33. Bohota is a large village pleasantly situated, and about 12 miles

* Vide Appendix.

distant. Before, however, you can get there the Joala range has to be crossed, which from thence to the Sutlej is very low, and might be easily passed over without being noticed but for the difference in its composition from the surrounding country, which is covered with a boulder formation interstratified occasionally with coarse sandstone. The Joala range on the contrary is composed of sandstone and marls of the saliferous period.*

34. About four miles further is the small village of Koorooe, the residence of the Rajah of Muhulmooree, the ex-Rajah of Cotoche, the grandson of the great Sansar Chund. The village is situated in the midst of low rounded hills covered with coarse grass; the road from Nadoun to Bilaspoor is crossed between this and Bohota. Mr. Vigne thus accurately describes the place :—"At a place called Kruhin (Koorooe?) situated in the midst of low and treeless hills covered with rank herbage I found the residence of the ex-Rajah of Tira, and his brother, the grandsons of the once powerful Sinsar Chund"..... "The residence consisted of two or three low thatched houses, and they were in the receipt of 30,000 Rs. (3000£) a year, which were collected from the surrounding country by permission of the Maharajah" (Runjeet Sing,†..... "The elder of the two brothers, and the rightful Rajah of Tira, were very civil and gave me a breakfast on the morning of our departure. Being Hindus they did not eat with me themselves, but a table was placed for me beside them, and they talked to me during the repast, which was served up in dishes made of dock leaves sewn together, and my drinking cup was also of the same material. The Sikhs are less particular in these matters than the natives of Hindoostan, and will eat twice and oftener out of the same plate, and many of the Sikh Sirdars are in possession of European China, but the Hindu, more especially the Brahmin or the Rajput, of which latter caste was the Tira Rajah, will not eat twice out of any vessel that cannot be cleaned with earth, and consequently they are eternally scouring their brazen cooking pots. When therefore they play the host the Hindus (and the Sikhs also in many instances) cause their dishes to be made of dock leaves (*Butea frondosa*) which are thrown away after they

* Vide a report on the Kohistan of the Jullundhur.

† For further particulars of this family vide travels in Cashmere, &c. by G. T. Vigne, Esq.

have been used, and expense of purchasing new crockery is avoided. The comparative absence of superstitious ceremony on the part of the Sikhs would render them as Sipahis better adapted for actual service than the other natives of Hindoostan."..... "The young ex-Rajah shewed me a friendly letter which his grandfather had received from Lord Lake by the hands of an envoy whom he had despatched to wait upon his Lordship after he had followed Holkar into the Punjab, and also a chit, or writing, by Mr. Moorcroft, given to, and in favor of Rajah Sinsar Chund, in which that open-hearted, intelligent, but unfortunate traveller, had spoken in the warmest terms of the kindness and attentions he had received by him." The British Government has not only left the Rajah in the undisturbed possession of his jaghir, but has increased his income by an annual grant of 18000 Rs. I saw the man Mr. Vigne writes of; his name was Runbeer Chund, and that of his brother, the present Rajah, is Purmode Chund. What Mr. Vigne describes as having occurred on his visit, took place in nearly the same manner when I was there. My friend and myself dined with them* on Christmas Day, but we had our own plates and dishes, as well as chairs and table. As wild hogs abound in the neighbourhood the principal dish was a fine joint of roast pork, besides palaws, curries, &c., and afterwards pastry covered with tinsel made by the ladies of the zenana! I could not help comparing the whole affair to the feeding time at the Zoological Gardens in England, when people congregate to see the wild beasts fed. Whilst the Rajah and his brother the Meer Sahib were trying their best to amuse us with an endless variety of questions, I could see that whatever we eat or drank, every motion in fact was attentively watched by themselves as well as by their courtiers, who sat in the adjoining room, and to add to our bewilderment, I discovered that the ladies were secretly glancing and simpering! To refuse the racy dainties made by such delicate hands while their fair owners were looking on would have been extremely ungallant, so, seeing no help for it, we set about our task with the best possible grace, but, alas! after such a hearty meal of pork there was little relish for the oleaginous delicacies so kindly prepared for us. So having put a bold face on the matter we ordered our kitmutgars to clear the table amidst many a gentle reproach of wah! wah! wah! from behind the curtain. After dinner the letters of Lord Lake, Mr. Moor-

* Runbeer Chund died a few days afterwards.

croft and Mr. Vigne were produced, and read, after which my friend translated from the works of the last two gentlemen several passages relating to the Rajah's family and their reception whilst passing through his jaghir, but when he came to the passage in which Mr. Vigne mentions that the Rajah and his brother had dark complexions, he just reversed the sentence and read out that they were fair ! In an instant the eyes of the Royal brothers sparkled, and they looked at one another apparently much delighted, a fair complexion being considered an indication of royal blood ; nothing pleased them so much as that sentence. However, the Rajah need not have been ashamed of his complexion, for his aristocratic and gentlemanlike manners shewed at once that he was born a prince. His manners were particularly refined and his gestures graceful. He was the first native I had met whose society was agreeable to me. His features were mild and had evidently been handsome. However of late years he had been a great sufferer from a large goitre which disfigured his neck. That frightful disease slowly wasted away his frame and at last killed him, on the 5th January 1848, only a few days after we left him.

Mr. Moorcroft thus writes of this man's grandfather :—"In the evening I waited upon the rajah at his desire, and found him with his son and grandson in an open building in a garden.* Rajah Sansar Chund is a tall, well formed man, about sixty. His complexion is dark but his features are fine and expressive. His son, Rai Anirudha Singh, has a very handsome face and ruddy complexion, but is remarkably corpulent. He has two sons, one of twelve and the other of five years of age, both darker than himself. Sansar Chund was formerly the most powerful Rajah from the Sutlej to the Indus. All the potentates from the former river to Kashmír were his tributaries, or dependants, and he was extremely wealthy, possessing a revenue of thirty-five lacs of rupees. He is now poor and in danger of being wholly subjected to Runjeet Singh. His misfortunes are mainly owing to himself, and his decline presents a remarkable contrast to the rise of his neighbour, and now paramount lord, Runjeet Singh."† As Mr. Moorcroft paid his visit on the 16th June 1820, the late rajah must have died at the premature age of forty,

* At Shujanpore Tira, afterwards described.

† Vide "*Moorcroft's travels in Bokhara, Afghanistan,*" &c., for further interesting particulars.

and his brother must now be about 33 years of age. The present rajah is a large, stout man with a plebeian countenance. He is a merry good-natured fellow, and puts one in mind of a jolly English hotel-keeper. He has an only daughter, and seems likely to die without an heir, in which case his property will escheat to the Government. Before I return from this long digression and continue my journal, I must mention what every body conversant with Indian history will acknowledge as a singular instance of fraternal love and a proof of the amiable disposition of the present rajah. During the long illness and helpless condition of the late rajah, his brother took the greatest care of him and managed his estate. The latter, moreover never forsook his brother when the Sikhs were treating him with every kind of indignity and depriving him of the fairest portions of his jaghir, giving them to his illegitimate brothers, who espoused their cause. Such has been the noble conduct of Purmode Chund, although by treachery and murder he might have possessed himself of his brother's property many years ago, as well as have ingratiated himself into the favor of the Sikhs, who were then overrunning the country. When we compare such conduct to that usually pursued on similar occasions by Indian princes we cannot but feel convinced of the purity of the attachment. What a refreshing contrast does this instance of disinterested devotedness form to the murderous treachery of the successors of Shah Jehan!*

35. Leaving Koorooee we marched over about five miles of low naked hills until we came to the ridge which separates this uninteresting country from the Seel-khund. An ascent of 500 feet brought us to the summit, whence we descended into a long and fertile valley. It appears to stretch out as far as the Sutlej in the neighbourhood of Bilaspoor, having its northern extremity bounded by the rugged pergunnah of Kumleh-gurh, and its eastern flank by the picturesque heights of the Sikunder-ke-dhar. A stream called the Sirr I believe, which is nearly dry at this season of the year, flows down the centre and empties itself into the Sutlej. Once in the valley our road turned to the southward, and crossing it diagonally brought us to the foot of the ghat which leads over the Sikunder range into Sookeyt. We encamped at a small village

* I regret having now to add that Purmode Chund, as well as the Rajah of Jaswun, has been weak-minded enough to rebel against the British Government, and has consequently forfeited his jaghir.

called Buttail, distant about 15 miles from Koorooee, and situated at the base of the last mentioned range. The sides of the latter have been terraced into fields to a very considerable height wherever the slopes permitted, whilst the remainder is covered with forests of pine (*P. long.*) Amongst the cultivation are numerous thriving villages and hamlets. The greater part of the Seel-khund* belongs I believe to the rajah of Mundi-Buttail, is not the regular halting place, but a village higher up the range called Hutli.

36. After a long and tedious ascent by a good road through villages and pine woods we arrived at the summit of the ghat. Looking over our previous day's journey the most conspicuous objects were the shattered peaks of the Chumba range far below which rises the serrated ridge of Kumleh-gurh. Then follow the low and treeless hills of Muhulmooree, which in their turn are succeeded by the Joala range, and this last in the far west by the Chou-mukhi and Kotlehr ridges. The range on which we were standing separates the Seel-khund from the Bul Dhoon, a profound valley bounded to the eastward by the lofty Nautehney-ke-dhar. In the depths of the valley appears the town of Sookeyt, surrounded by dark woods, near which glides the Sookeytee river, flowing to the northward and glittering in the rays of the sun like a silver cord. On isolated peaks of the Nautehney-ke-dhar, as well as on the Sikunder range, are many towers or forts, which but a short time ago afforded shelter from the mereiless swords of the Sikhs to hundreds of wretched beings. To these strongholds the peasantry used to flee for protection from the rapacity of their heartless rulers. By a steep and good road we descended into the valley and halted at the first village. In the Seel-khund we passed an extensive encampment of gypsies, the first I had noticed in this country. Also just after leaving Buttail I remarked a heap of stones placed in the centre of the road. These are formed I believe by Tartar tribes who invariably pass them on their right hand, as well as throw a fresh stone on the pile.† The above however, must not be confounded with the conical piles raised on conspicuous points or peaks in honor of their gods by almost every tribe of mountaineers in the world, whilst they are in a state of barbar-

* I believe it to be the same as the one which Mr. Moorcroft calls the Bathel valley.

† Vide Loyd's and Gerard's "Travels in the Himalaya."

ism. It is also a favorite practice of the Moguls in Central Asia to erect these heaps to the honor of their gods, by whom they are called "obos."*

37. Yesterday's march being a fatiguing one of 14 miles, we were not a little glad at finding the Sookeyt was but 5 or 6 miles off, and that the road was level and good. The residence of the Rajah of Sookeyt is about two miles from the capital, and is built on the western slope of some high hills, whilst the town is placed at the foot, where their slopes are much more precipitous. The situations of both are picturesque, and a fine view of the Dhoon is obtained from the former, but the building itself is not worthy of a description, nor has the town any thing peculiar about it save its extreme unhealthiness in consequence of being surrounded by a dense jungle. The Rajah and his sons have very plebeian countenances, and are not polished in their manners, but these deficiencies are fully compensated by their frank and open way of speaking. The Rajah is evidently above bespattering Europeans with loathsome flattery, and telling lies for the sake of pleasing, like he of Mundi. When it was mentioned to him that we had been given to understand that he was a great friend of the Rajah of Mundi, he replied "Yes, you may call us friends, for it is of no use our quarrelling, as the British Government will not permit us to fight. The Mundi-walla however openly pretends to be a great friend of mine, but in reality is ever striving to do me as much harm as he possibly can." Were the British influence withdrawn but for a short period it is not difficult to foresee what would be the result. These two rival Rajahs would in collision with each other, depopulate villages and lay waste fields; and it would indeed be difficult to say to how great an extent barbarities might be practised upon the vanquished by who ever became victorious. The will of the Rajah of Sookeyt is law within the limits of his own jaghir,† which is said to be worth about 60,000 Rs. a year. Out of that sum however, he pays the Government 11,000 Rs. annually.

38. The Bul Dhoon, or valley of Sookeyt Mundi‡ is very fertile and entirely under cultivation, excepting a small swampy preserve which sup-

* Vide travels of the Russian mission through Mongolia to China, by George Timkowski.

† As is also that of his neighbour in Mundi.

‡ So called because part is in Mundi and part in Sookeyt.

plies the table of the Mundi-walla with game, and sport in procuring it. The wild boar abounds in the wooded heights around, from which they descend and commit great havoc in the fields of wheat and sugarcane. The villages are generally situated on the slopes of the mountains, where the inhabitants escape the effects of malaria. On the Sikunder range are many picturesque-looking villages and plots of terraced land which are limited at their upper extremities by forests of pine, but on the opposite side of the valley the slopes are more precipitous and covered with larger tracts of jungle and forest, whilst the hamlets are more scattered and the cultivation is less extensive. The summits of the Nautchney-ke-dhar are also more lofty and are frequently covered with snow. Mundi-nuggur is about 12 miles north of Sookeyt, and the road all the way is excellent. It runs through the valley for the first 10 miles or so, and then passes through a narrow ravine along the left bank of the Sookeyt river. Altogether it is one of the most delightful marches I have ever made, for the road is nearly as level as a bowling green for the greater part of the distance, and look whichever way you may one cannot fail to admire the majestic scenery. On the road we met scores of coolies carrying on their backs kiltla-loads of the Mundi salt. I have seen some of it in the bazars of Loodiana and Subathoo. It is very impure and causes the body to swell. From this circumstance I should suppose the people either do not or cannot cleanse it sufficiently. There is a curious custom practised in this neighbourhood. The women, gaily dressed, assemble in groups to greet the stranger with songs as he enters each village, for which honor he is expected to bestow a rupee on each knot of Syrens which I thought was dear enough for such melody. The rajah of Mundi is a handsome man, but his appearance and manners are rather effeminate. He has two sons and is himself the natural son of the late Rajah.* His income is reckoned at four lacs of rupees a year, nearly the whole of which is derived from his salt and iron mines. Half of the above sum he pays annually to Government. The present Rajah is very fond of copying English customs, such as shaking hands, driving a buggy, &c. Adjoining his zenana, which is a great ugly building, he is erecting a palace of sandstone which promises to be a handsome residence. In front of this is a large square tank, around

* For an account of this man see Moorecroft's travels.

which lies the town, a large and thriving place. A small garden enclosed by high walls, in the centre of which the Rajah has built a small two-storied house after an English model, likewise adjoins the zenana. The rooms are covered with elegant paper, the windows and doors are glazed and have curtains hanging on each side moving on brass rods. The furniture consists of a rose wood table, chairs, sofa, chandeliers, mirrors, and pictures, whilst excellent Brussels carpeting covers the floor. The pictures consist of an engraving of the Queen in her coronation robes, and then of Her Majesty taking a ride in Windsor Park, and one of Prince Albert, shewing the bust encircled with a wreath of shamrock, thistle, &c. I am able to give but few particulars of Mundi-nuggur which are not already known.* It is divided into three parts. The town is built within the angle between the left banks of the rivers Sookeyt and Beas : a space between the town and the mountains in the rear being set apart for the lowest caste of the inhabitants. The next portion may be called the suburbs, which consists of scattered dwellings on the slope of the Gogar range, which terminates abruptly on the right bank of the Beas. The last lies between the right bank of the Sookeytce and the left of the Beas. It is a level piece of ground, of a triangular figure and about seven acres in extent. This field (for it is nothing more) has an excellent road all around it (on which the Rajah takes his drives in a buggy) and may be styled the mall. Our tents were pitched on the centre of this plateau. The town has a neat appearance from the circumstance of all the houses having slated roofs. On the summit of a spur behind the town, the Rajah has built a neat Hindu temple ; he was also building another on the left bank of the Beas. He has caused many of the streets to be widened and levelled to enable him to drive about in his gig. Perhaps at no distant day the inhabitants may be indebted to the vanity of their ruler for wholesome sanitary reforms, as they are already for facilities of travelling. I fancy that pigeons are held sacred, as there are several cotes in the principal streets filled with that sort of bird. The sides of the enclosing mountains are precipitous, and mostly covered with dense jungle, in which hogs and various kinds of deer abound. The climate is as hot as that at Rampoor on the Sutlej during the hot weather and rains, but snow falls at both the places during the winter. The vegetation is decidedly

* Vide Thornton's Gazetteer of the Provinces adjacent to India.

tropical ; a species of palm, plantains and peepuls, thrive here, although pines and stunted oaks grow nearly at the water's edge in the ravine which unites it with the Bul Dhoon. I saw one or two stunted peepuls near Bajoura in Kulu, which cannot be less than 4500 feet above the sea, as Sultanpore, but six miles higher up the stream, is 4584 feet. The winters are very severe in Kulu, although the summers are hot.

39. After taking leave of the Rajah we commenced our journey towards Kulu on the 10th January. We crossed the Beas in a boat and proceeded for about two miles along its right bank and then commenced the ascent of the Goger range, a long and tedious operation. The descent from the ghat to the right bank of the Hulhu (or Oohl) is very sudden and steep. That river is nearly as large as the Beas at Mundi-nuggur. We crossed it by a Sanga and kept along its left bank until we came to the point where the Ootursal flows into the Hulhu ; we then continued along the left bank of the former until within a mile of the hamlet of Kamaud, where we halted at a Barra-durree built at the expense of the present Rajah of Mundi. It is placed in a deep glen, and the surrounding mountains present either bare precipitous cliffs or smooth but steep declivities covered with coarse grass. As from the Barra-durree no trees save a few cheels are visible, and the encircling mountains are rocky, precipitous, and barren, the surrounding scenery is desolation itself. This gloomy spot is about 10 miles from Mundi-nuggur.

40. When we arose the next morning a sharp hoar frost covered the ground and a covey of Chukor* were feeding around our tents. Having started we kept on the left bank of the Ootursal for about $1\frac{1}{2}$ miles, and after fording it we turned off to the left up a ravine which leads to the pass over the high range of Tiri. Passing through some fields of wheat and by some hamlets, we came upon a few rhododendrons and oaks, some of the former being in full blossom ; afterwards for the last 500 feet we ascended through a continuous forest of oaks, rhododendrons, and other trees, and though the sun shone bright and was hot, a hard frost covered the ground, and large patches of snow lay here and there in the pass as well as on the higher peaks. Cedars, oaks, and pines, cover in dense forest the crest of the Tira range. The eastern slope was likewise bound up in snow and frost, and is covered nearly to the

* Perdix Chukor.

bottom with a dense forest impervious to the sun's rays. Through this we descended many hundred feet over beds of frozen snow, and although the great exertion of ascending had caused us to perspire freely, the instant we commenced the descent on the other side all perspiration was checked, and it was as much as we could do to keep ourselves warm. The path the whole way continually crossed and recrossed the bed of a torrent, until we halted at Bajoura, in the valley of the Beas in Kulu, from which river we were then scarcely half a mile. At that place is a large Serai-like enclosure divided into two unequal parallelograms, and called a fort. At each corner is a quadrangular tower divided into four stories, and surmounted with a Chinese sort of slated roof. The Himalaya between the Ravee and Sutlej rivers and the Chumba range usually presents towards the plains abruptly steep fronts and comparatively gradual slopes, in the opposite direction from the strata dipping in general to the north-east, and as this is frequently repeated, we have a succession of ascents and sloping sides, with a deep and often wide valley intervening between the successive ranges, and thus in travelling across this tract we have a succession of ridges and valleys to pass over, and, in proportion to the elevation to experience changes of climate, and to witness a repetition of geological structure and of animal and vegetable forms which are dependant on this and on the climate.

Thus far the physical features of this district accord with those of that portion of the Himalaya which lies between the Sutlej and Kalee rivers, and then the similarity ceases, for in the latter a deep and narrow ravine generally intervenes between two successive ridges, in which usually runs a small river flowing either towards the Ganges or into the Jumna, or their feeders, or into those of the Sutlej or Kalee, but the drainage of these great rivers is every where separated by transverse ridges which connect the parallel ones, having their points of junction often projected into peaks.* By proceeding along these spurs one may penetrate far into the interior without having occasion to descend into the ravines, a plan which cannot be adopted in the Kangra district.

41. A march of six miles along a good and level road on the right

* Vide "Report of the Mineralogical Survey of the Himalaya mountains lying between the rivers Sutlej and Kalee," by Capt. Herbert. Jour. As. Soc. 1842, also Dr. Royle's "Flora of the Himalaya mountains."

bank of the river brought us to Sultanpore, the capital town of Kulu. This portion of the Beas* flows through a ravine rather than a valley. At some places the ravine must be nearly a mile in width. The hills on both sides, excepting just at their crests, are bare and treeless, a great part of the valley strewed over with trunks of trees, boulders, and silt, which were brought down by the great flood that occurred during the rains of 1845. We passed only one hamlet on the road, for the majority of the inhabitants reside high up on the slopes of the surrounding hills, to avoid fever and ague, which are prevalent in the valley during the rainy season. Sultanpore is a small straggling town, nearly a fourth part of which is composed of the Rajah's residence and out-buildings.† The Rajah is constantly complaining that the Government promised him a jaghir worth 12,000 Rs. a year, but gave him one worth only 8,000. He is a diminutive and insignificant little being. The Serbari flows from the westward to the Beas at Sultanpore, which is built within the angle formed by those two rivers. Beyond this the valley of the Beas contracts and the enclosing mountains appear to be more lofty. When I saw them, they were covered with snow to nearly their bases which circumstance prevented my proceeding further in that direction. For the same reason I was unable to visit the lead mine which exists in the neighbourhood, and I believe within the Rajah's jaghir.

42. Disappointed at not being able to proceed northward I determined to make the attempt to the eastward and therefore fixed upon Maruni-karu as the goal. From Bajoura to Brahma-kotee is about 10 miles, and the pug-dundee, or foot path is very bad. I was obliged in consequence to leave my horse behind. Two miles above Bajoura the Beas is crossed on bullock skins, and for the rest of the way the route lies along the left bank of the Parba or Parbati, which flows many hundred feet below. Within the angle formed, on the left bank, by the two above mentioned rivers, is the village of Bho-en which was a thriving place until nearly destroyed by the Sikhs. After leaving that village we entered the glen of the Parbati, which for the first two miles is very narrow and the sides of the mountains precipitous. Afterwards, how-

* The Beas is divided into two parts by an island covered with jungle, near Bho-en, and below and above Sultanpore.

† There is a fair held in the town during the rains. (Vide Appendix C.)

ever, it widens and the slopes of the hills on the left bank become much more gradual and are laid out in fields and villages. Brahma-kotee is a large and thriving village. At certain seasons of the year woodcocks and pheasants are plentiful in the neighbourhood.

43. To Main-karu is another ten miles, the path ascending and descending as often as in the march before. For a good part of the way we went through a forest of pines and cedar trees, which latterly reached the edge of the water. We also passed through several populous villages, and saw extensive plots of cultivation. Within a mile of our destination we crossed the river by an excellent sanga, under which the water roared and fretted in its contracted bed. During the winter months the frost is seldom if ever disturbed by the rays of the sun, which then penetrate but for a few hours daily the gloomy depths of the ravine. When I arrived a hoar frost covered the ground, whilst a little higher upon each side the slopes of the mountains presented one vast unbroken sheet of snow, the dazzling whiteness of the latter being relieved by the dark green pines, which appeared darker by the contrast. To the eastward also it appeared as if the ravine were abruptly terminated by a colossal mountain of snow from which chilling blasts of wind every now and then swept through the glen. Then again the mysterious jets of steam, which slowly curling upwards and uniting formed one vast column of vapour until lost in air, contributed not a little to enhance the solemn majesty of the scene. A remarkable increase in the temperature is perceptible within a hundred yards of the boiling springs, and the surrounding atmosphere is so charged with the steam that it saturates every thing within its influence. In a few seconds I found every thing about my person quite wet, and when I ascended to some bare cliffs, on which the snow was not lying, to examine the rocks, my clothes were immediately frozen as stiff as pasteboard, and greatly impeded my walking. In fact it is a difficult matter to find a spot for one's tent free from this inconvenience, for should the wind veer, which it does frequently, the whole body of steam blows over your tent and baggage, wetting them through in a minute, which as soon as the blast is over or driven in another direction, are taken possession of by the frost, only to be relinquished again however at the next visitation. As I was not suffering from any malady, but on the contrary never felt better in my life, I felt no relish for

vapour baths and icy accompaniments, so I retraced my steps and encamped on the opposite side of the river near the wooden bridge, which spot I recommend all future travellers to select, without they wish to undergo the same severe treatment. The springs are very copious, and issue from the ground in half a dozen different places. They all deposit large quantities of calcareous matter, which is first of a brick red color and afterwards when dried, of a yellowish brown. It resembles in fact calcareous sinter. The temperature of the water is sufficiently great to enable the pilgrims who annually resort there to cook their rice in it, doing which is considered a holy act, though not so much so as bathing in it, for which purpose some of the water is collected in a tank and covered over with a shed. The village of Mani-karu is without exception the most miserable of all I have ever seen. It consists of about twenty houses in a most wretched condition, and their inhabitants are squalid and poverty-stricken. They appear to do nothing but sit on their haunches on slabs of slate which being placed over a stream of hot water, keeps them warm. Thus huddled together they seem to spend their days in drowsy listlessness.* Unable to proceed any further to the eastward I retraced my steps to Mundi-nuggur, and got over the Tiri pass just in time to escape being blocked in by a heavy fall of snow, which occurred shortly after.

44. The sloping flanks of the mountains are cultivated with an industry almost incredible wherever there is a sufficiency of soil. The fields on these slopes are generally long narrow strips of ground, which rise one above another in terraces to great elevations, and even up steep acclivities. Each terrace is raised above the one immediately below it from one to twelve feet, according to the abruptness of the slope. They are levelled with great care, and are watered by rills conducted from a distance, which is sometimes considerable. These generally flow into the highest and thence the water runs successively into each of the others. In many places the fields are carried to an extraordinary height, and there the effects of increasing elevation upon the temperature and upon the crops are strikingly observable in the diversity of tints the produce assumes. The highest is in fresh blade, and brilliantly green, while the lowest is sere and ripe. These effects of aspect and elevation upon the cultivation are often very remarkable, for, while on the uplands

* Mani-karu is probably about 4,800 feet above the sea.

the produce is green, it has been reaped and carried at the base of the valley! Perhaps these are no where so extraordinarily exemplified as in the Kangra valley, where, on the Chumba range, the vegetation of temperate regions predominates, whilst but 3,000 feet lower in the valley the majority of the fruits and vegetables belong to the tropical. The hamlets in Kooloo seldom contain more than from fifteen to twenty houses, but generally not so many. Single houses are numerous, and, from their being scattered amongst the fields, give an agreeable variety to the bold landscape. This distribution of houses arises, however, more from necessity than choice, because the lands available for cultivation are usually of small extent and widely separated, and consequently could not support large communities. It is also imperatively necessary for the husbandman not to place a ravine or any other impediment between his hut and his fields, as all communication with them would probably be cut off during the greater part of the rains which, as everybody knows, is an important season of the year in India. The case is somewhat altered, however, on the left bank of the Parba, where there is more than the usual quantity of arable land, and consequently the villages are large, thriving, and numerous. On the right bank of that river the slope is much more precipitous and has been left in consequence almost entirely unoccupied.* In those districts near Simla which border on the plains the dwellings have flat mud roofs, but here where snow falls in winter the houses have pent roofs, which are covered with slabs of either sandstone or clay-slate. Wood is seldom, if ever, employed, and very little attention is paid to the splitting of the slabs, which consequently are of every size, and thickness. From that circumstance the majority of the scattered huts have a very untidy appearance. They are generally two-storied, the lower being invariably used for cattle and the upper occupied by the family. The upper one is generally surrounded by a low covered gallery, in which the inhabitants usually sit when at leisure. Some of the houses, however, are nothing less than four-storied, quadrangular towers. Their average height is about twenty-five feet, each story being seldom more than five feet high and ten feet square. Many of these larger houses and all the temples, have

* This prosperous portion of Kulu lies within the jaghir belonging to the petty Rajah of Sultanpoor; whose ancestor possessed the whole of Kulu until deposed by the Sikhs.

roofs after the Chinese fashion, which gives them a singular but pleasing appearance. The pitch of these roofs is great, being formed of either two or four concave surfaces joined at the summit and diverging down to the walls, where they project horizontally three or four feet into eaves. The walls are generally built of wood and stone without any cement, and they look substantial. Between every two or three feet of stone is placed a thick plank of fir, and thus stone and wood are employed in all their domestic buildings. There are a couple of temples on the left bank of the Parba built entirely of wood of the cedar (Keloo). They are elaborately carved and stand upon square platforms of stone raised three feet above the ground. Their roofs are pyramidal and project beyond the walls, like those of Chinese buildings. All around the edges or eaves are suspended wooden drops neatly carved and so loosely hung that they rattle in every breeze. Their interiors as well as exteriors are also richly carved and decorated with figures of deities.

45. The natives of Sookeyt, Munde, and Kooloo, have sallow complexions and appear to be the same race of men as the inhabitants of Bushair. In fact many of the coolies employed in carrying baggage between Simla and Kalka are men from these states, who are attracted there by the very extravagant rate of wages, which average one anna a day in their own districts, but from four to six annas on the left bank of the Sutlej. The men are generally tall and strong, but few of them are handsome. Many of the young women are pretty, but at the age of 20 or 25 become coarse and stout. The dress of both sexes is nearly the same. It consists of a drab-colored woollen frock, trousers of the same, or of leather, and a flat skull cap, generally black, with sandals made of coarse grass. The woollen cloth called "puttoo" is manufactured by themselves and resembles thick coarse blanketing. It is sold in pieces of 10 inches in width and about 21 feet in length at 2 Rs. 8 as. or 3 Rs. a piece, according to the quality. Both sexes wear a girdle around the waist, and the men generally go bare-legged during the hot weather. They seldom if ever, wear shoes, the richer classes however wear worsted stockings and shoes when they go out. The women instead of the cap sometimes have a colored piece of cloth tied round the head, and occasionally twist their hair into one long plait, the end of which is then ornamented with slips of colored cloth or shreds of worsted. The plait is by no means unbecoming to the young. The

dress of the women on the western side of the Seukundir range consists on the contrary of a tightly fitting body and sleeves with a full petticoat having a broad border at the bottom. Their favorite color is a light yellowish chocolate, whilst the border is generally of a deep blue or of some other dark color. A veil is thrown over the head and shoulders, as in the plains. If they meet an European they stop and turn their backs to him until he has passed, a custom which always reminded me of the ostrich. The men dress pretty much in the same manner as those on the plains. Like all Asiatics, the women of Kulu and the adjoining states are inordinately fond of ornaments, which are of the usual description, with the exception of mother o'pearl amulets, which none are without, not even the males. The amulets consist of small thin plates of mother o'pearl of various sizes and engraved with mystical figures. Several of these are slung around the neck and hang conspicuously on the chest. I believe polyandry is unknown amongst them, nor are they guilty of infanticide, but polygamy is general. Travelling is generally performed in jaunpauns by those who can afford it. The jaunpaun is like a large tea tray with a pair of bamboo shafts behind as well as in front. I cannot say I admire this kind of vehicle, for one is either toppling over in front or slipping out behind, or falling headlong over the side into the Khud, to say nothing of the difficulty of packing one's legs, &c. &c. The ladies have theirs covered over with a scarlet cloth. All agricultural labors, with the exception of ploughing, are performed by the females, while the men too commonly sit idling at home, but such indeed is the state of the weaker sex in all uncivilized communities; the corn is cut with the sickle, and burdens are usually carried in kiltas or large conical baskets over the shoulders on to the back, the general mode of carrying loads in the Himalaya mountains. The mountainers of those parts have long been much in the habit of ill-treating their wives, and since the introduction of our laws the desertion of their husbands by the women has been pretty general. The men of Kulu laid their grievances before the proper authority, by whom they were told that since, before the British rule, they valued their cattle more than their wives, they must now reverse the custom, and take greater care of their wives, a system of valuation they evidently could not appreciate, as wives were more plentiful than cattle.

46. About Subathoo one sometimes sees infants wrapped up like little

mummies and laid in such a position that a small rill of water falls on their heads. These infants are usually watched by some elderly female apparently their great-grandmother, whilst their mothers are employed in the fields. The natives believe that this ordeal strengthens the children and renders them hardy, and that it cures dysentery and various other diseases. But the common object is I believe to keep them asleep, and that this is found to be the most effectual means of doing so. I could never ascertain whether the inhabitants of the mountainous district on the right bank of the Sutlej adopted this plan or not, but should think it most likely that they did. The chief wealth of the people consists in cattle, a small horned kind, sheep and goats, with occasionally a few buffaloes. The rest of their subsistence depend upon their crops. The majority are intelligent, often shrewd and very inquisitive, but with all this in their favor they are frightfully superstitious. In fact it is almost impossible to believe that human beings could be such idiotic dupes as those poor simpletons undoubtedly are. They have great dread of the "evil eye," and are constantly having recourse to the magic art of witch finders, who feign the power of discovering all evil spirits which wander over the mountains in the tangible form of witches. If a cow or any other living creature dies its death is immediately attributed to some "evil eye," and a witch finder is employed to discover it. This impostor having selected some old woman who has no means of propitiating him by gifts, places his victim in the centre of a group, whilst all who are interested in the case sit around her in a circle. He then commences dancing round the poor creature, and ultimately nods his head towards her, whereupon all the lookers-on do the same, which coincidence is deemed an all-sufficient proof of the poor woman's guilt. She is subsequently condemned to be burnt to death! But since that district became a British Province these inhuman proceedings have not been allowed to take place, but another method almost as cruel has been substituted in its stead. In this case they declare the victim of their superstitious credulity an outcast, and refuse her the commonest necessities of life, thus she is abandoned to her fate, and would probably starve to death but for the timely gift of a goat or a sheep by some one of her relatives to the witch-finder, who forthwith fastens the guilt on some other person in hope of extorting in a similar manner from the relatives of the last accused. In this way these im-

postors, aided by the credulity of the people, thrive, and though some might wish to have them expelled from their villages, fear of the power of these miscreants to call the wrath of their gods upon them, prevents it. However, the apprehension and punishment of some of these rascals have lately done much towards dispelling the implicit faith put in their supernatural powers, and the people begin to think that the evil spirits are afraid of the English, and consequently obey them! Now it appears to me that education, and that alone, would open the eyes of the people to these monstrous absurdities. Moreover, that it would be folly attempting to convert them to Christianity until their faith in such things was first shaken by the mild influence of education. I will venture to make some additional remarks on this subject in an Appendix.*

47. The inhabitants of the Chumba range appear to be a different race of men. They are shorter and appear much stronger, and are certainly cleaner about their persons. They call themselves Rajpoots, and say they belong to the Guddee jat, which is the coolie caste, I believe. They are a sharp set of fellows and are consequently able to impose upon their less knowing neighbours. Most of the witch-finders are Chumba guddees, which says a good deal for their craftiness. When Europeans made their first appearance in the Kangra valley these men had very slight notions of caste and would eat or drink any thing the former gave them, whereas now since their contact with the natives of the plains, they have become as bigotted as any Hindu, and moreover have learnt the art of cheating Europeans in great perfection. The Chumba guddees may always be known by their peculiar conical caps, with lappets to turn down over the ears like an English travelling cap. As we proceed from the plains into the interior it is very interesting to remark the gradual change in the features, from the Hindoostanee to the Tartar-like countenance of the Lahoulees. These last are a totally distinct race from any of the former. The Lahoulees are a short sturdy set of men, very ugly and filthily dirty. The women are decidedly plain. The costume of both sexes consists of a pair of loose woollen drawers, with a frock of the same material, whilst a wrapper is also often wound around the body by being thrown over the shoulders and fastened by a brass clasp in front. Their dress is generally of a black color or a kind of plaid, and their caps are of the same. The women wear their hair

* Vide Appendix D.

either in long plaits fastened at the back of the head with a profusion of red wool and coloured shreds, or comb it back off the forehead, tying it in a lump behind, and adorning it in a similar manner. Around the flat circular caps are strong large white shells like cowries, glass beads, and pieces of amber. Around their necks both men and women wear amulets of mother o'pearl, pieces of amber, turquoises and other precious stones. Each man has hanging to his belt, a tinder pouch and a brass instrument for striking fire, with many other nondescript implements. They spend 6 months of each year in Kulu on account of the severity of the winter season in Lahoul. The greater part of that time they pass in dancing and drinking. On their jubilees they set off fireworks and make a tremendous noise, whilst the women dance. These exhibitions do not terminate until they are all too drunk to continue them. All the mountaineers are fond of spirituous liquors, especially of brandy, but I believe do not often drink it to excess. By special invitation I went to witness the commencement of one of their orgies; I never laughed more heartily than at the grotesque figures I saw around me on that occasion. The women were most ridiculously decked out, especially the aged dames, who appeared to me as the very personification of witches! Many of the young damsels had beautiful eyes, of which they made the utmost use by staring at the stranger. Their characteristic costume, their long cues of hair, and felt caps stuck coquettishly on one side, and the peculiar bunchy knot peeping out behind, to say nothing of the ornaments, produced a most ludicrous effect, whilst they shuffled and wriggled their bodies about in the dance. The men were all this while either quietly looking on or beating tom-toms and other indescribable instruments, with which they succeeded in making a most disagreeable noise. I cannot say whether such a tamasha prevails on ordinary occasions.

48. There are two routes from Mundi Nuggur to Shujanpoor, passing by Drung,* the first follows the course of the Beas until it escapes through the Sekunder range.† The road then turns off to the right or

* In my report on the Kohistan of the Jullundhur, I most unaccountably placed Drung on the eastern flank of the Gogar range, whereas it is situated on the western.

† Whether the Sekunder range has been named after Sekunder Lodi of Delhi, or Alexander the Great, I am unable to decide, but am inclined to coincide with the former opinion. I made every enquiry after the altars built by the latter, but obtained no clue.

northward, and passing over the last named range, arrives at Gunha, whence going through Hara-bagh, Beijonath and Jeysingpoor, reaches Shujanpoor Tira, the road between the ghat over the Sekunder range and Beijonath passes through a rugged mountainous country, where it alternatively ascends and descends, and is generally bad. Gunha and Beijonath are two villages, the former is built on the slope of a mountain and near some salt mines, whilst the latter is a still more miserable place. By this route it is six marches, and by the other *viâ* Kumleh-gurh, five to Shujanpoor.

49. From Mundi-nuggur to Sekund is about 12 miles. We commenced the march by ascending about 1000 feet to the top of the range in the rear, or to the west of the town. The road then wound round along the table summit of the hills to the north-westward for several miles, and at last gradually descending brought us to a knoll at the foot of the Jinneytree ghat. About half way we obtained a fine view of the Bul Dhoon and Sookeyt; I was not a little surprised at finding a species of palm, the mango, and the peepul growing on the heights above Mundi-nuggur, which is 2637 feet above the sea. I saw a species of oak and the rhododendron growing much lower. There is to be seen an immense deal of cultivation on either side, and but few villages and woods, excepting on the highest ridge; the march nevertheless was a delightful one, for we were surrounded with delightful scenery of a wild and romantic character.

50. On leaving the hamlet of Sekund we commenced the ascent of the highest ridge of the Sekunder-ke-dhar. The first part of our route up to the summit of the Jinneytree (or Janitri) pass was through a beautiful forest of oaks and rhododendrons, many of the latter being in full blossom. It put me in mind of Simla, but the site has many advantages over that of the latter sanatorium. Its proximity to the Chumba range and the snowy peaks of Kulu, with fertile valleys below, are no slight recommendations. The view besides, from the Janitri ghat far surpasses that from Jacko. However at first sight it does not appear so accessible as Simla, but I suspect a road could be made along the upper part of the range as far as the Sutlej opposite Bilaspoor, whence to Roopur a good road already exists. I have before attempted to describe the view obtained from the ghat* and therefore need not do

* See report on the Kobistan of the Jullundhur.

so here. There are some persons whose dispositions are so contented, and whose wishes are so limited that they are happy in the performance of the daily duties which their situations impose upon them; satisfied with the spot where their destiny has fixed them they never allow their minds to be disturbed by sighing for a change, and are willing to remain in one place for the whole period of their lives. What a different disposition is mine. Restless and uncomfortable when obliged to be stationary, I am forever longing to visit the least frequented recesses of the earth, or to sail over the boundless ocean in search of some unknown shore. Nothing is so gratifying or so refreshing to my feelings as motion, and whilst my love of wandering often urges me to travel over untrodden paths, I have felt that my mind could never weary of exploring the wonders and admiring the beauties of nature. Often have I gazed on the solemn death-like majesty of the Himalayan range, the outlines of whose summits covered with eternal snow are so beautifully developed by the cloudless azure of an Indian sky, and as often whilst thus silently gazing on those mysterious works of nature a thrilling awe has involuntarily crept over me and filled my mind with delightful melancholy.

At this point the western face of the Sekunder range is very barren and steep. This abruptness and sterility are caused by the strata dipping to the east and out-cropping to the west. It is a general observation that the south-west and west aspects of mountain ranges are precipitous and rugged, while their opposite faces slope less rapidly and spread over a greater extent of country. These characters are peculiarly striking throughout the various ramifications of the Himalaya, and nowhere more remarkable than in the Sekunder range. With the exception of a few stunted oaks and rhododendrons which we met with during our descent of the first 500 feet, and here and there a peepul planted at the turns of the road, we saw no others until we got into the less exposed dells, where mangoe and other forest trees were growing luxuriantly. When we arrived at the bottom of the Soanc khud we halted at Dhurrumpoor, a village completely hidden by trees. The Soane is a small stream which empties itself into the Beas, and is nearly dry for the greater part of the year. This last march is about 10 miles long but it is very fatiguing. The ascent from Dhurrumpoor to the Janitri ghat must be very trying, as the descent is tiresome enough.

51. On the following day, the 26th January 1848, we marched up the Soane khud for about a mile and then turned to the right up another and very tortuous ravine. This led us to the foot of that remarkable ridge on which Kumleh-gurh stands. The Soane khud is prettily wooded with bamboo, the mango, and the silk cotton tree (*Bombax heptaphylla*) but the hills generally are very barren, and are covered with coarse grass. The sections exhibited an indurated and calcareous conglomerate interstratified with coarse sandstone, and occasionally lignite in the shape of trees. Kumleh-gurh is built on a long narrow ridge of the same materials running nearly due north and south, and throwing out spurs in various directions. Between the spurs its slopes are very precipitous, and often perpendicular. Its summit is also deeply serrated, and on these somewhat isolated peaks are situated the fortifications, insignificant in themselves, but strong by position. It is approached by good paths from the east and west, which unite within a quarter of a mile of the gateway, and terminate within a hundred feet of the same. This is succeeded by a rude flight of stone steps and a moveable wooden ladder which completes the ascent. The gateway is built in a serrature between two peaks. The entrance is effected through a common door-way leading into a dark winding passage. After this come a few more steps, and then a quadrangle, which would probably hold about 500 men. The apartments are arranged along the sides. Passing through the quadrangle, we came upon an excellent flight of steps which led us to the top of the highest point, on which is a Hindu temple. The view from that is very fine. The Chumba and Sekunder ranges, the palace of Tira and the hill of Asapooree, with the fertile pergunnah of Jeysingpore and the silvery Beas at its feet, form scenery of a most varied and romantic character. On the points adjoining the temple are other small buildings capable of holding a few men each. Some of them however, have been lately pulled down by order of the Mundi Raja, as they entailed too great an expenditure. When Lord Hardinge visited Kumleh-gurh he compared it to Gibraltar, which he must have meant as a mere compliment, for had His Lordship really thought so, he would not have made it over to the Raja of Mundi. The Sheiks evidently considered it an important position and kept a strong garrison there. It labours, however, under the usual disadvantage—a scarcity of water. If I recollect rightly the only water near at hand is

procured from a stagnant pool near the gateway. Sinking wells in the hard conglomerate rock would be fruitless, so the evil cannot be remedied. In the details given of the place I may possibly err a little, as I did not like to pull out my note book and make notes on the spot, I preferred trusting to my memory and committing the result to paper on my arrival in camp.* Leaving Kumleh-gurh we descended by the western path into the stony bed of a ravine, which we followed for a short distance, and having ascended some rising ground entered a fertile and picturesque valley. After the cheerless and desolate hills we had just traversed, such a sight was indeed delightful, the pleasure moreover was greatly enhanced from its not having been anticipated. We were ignorant of the existence of such a lovely spot until we met with it. We viewed it moreover under very favorable circumstances. All the fields were sown with grain, and the wheat was just springing up under the influence of some seasonable showers and a genial sun. On the left bank of the Beas the terraced slopes, gradually decreasing in height, are blended with the fields which skirt the river. On the opposite side are the fertile pergunnahs of Raj-ghirri and Jeysingpoor, separated by low wooded hills from the elevated plains which slope up to the Chumba range. Throughout its whole extent the valley is studded with populous villages and wooded hamlets, and its fields with picturesque groups of bamboo, mango, or silk-cotton trees. Here and there also a solitary palm rears its graceful crest regardless of the chilling blasts which descend from the adjacent snows. Through this charming vale the Beas also winds its way and presents a glassy surface, broken every now and then by gentle falls, down which its waters roll in mimic cataracts. It must be confessed however that the wide sandy bed of the river detracts somewhat from the general beauty of the scenery. Unfortunately all Indian river scenery lies under the same disadvantage, excepting those in the Province of Bengal. In the hills the river beds are usually covered with boulders, bleached by the sun, and in the plains (at least in the North-Western Provinces) with fine white sand. This must always be the case wherever rivers periodically extend the limits of their beds. Having performed a march of 15 miles or more, and moreover, having been on our legs from sunrise until sunset, we were glad to reach

* Mr. Moorcroft's description of the place is quite unaccountable; he must have received it from interested parties.

our encampment at the little village of Sunghole, which is pleasantly situated near the river, and in the valley above mentioned. The Bar-kur Khud throughout its whole length forms I believe the boundary between the British and the Mundi Raja's territories. A part of the picturesque valley above described, and which I propose calling the Sunghole Dhoon belongs to the latter.

52. The march to Shujanpoor is about 9 miles in length. The usual route lies along the left bank of the Beas, but we crossed it about a mile below Sunghole, and passed over into Jeysingpoor, a part of which belongs to the Meer of Raj-ghirri. He is a natural son of Futteh Chund the traitor.* The pergunnah of Jeysingpoor is very level (at least that portion of it which I saw) and contains many thriving villages situated amidst luxuriant fields and shady copses. The adjoining pergunnah is that of Raj-ghirri, which appears almost as fertile. We passed by the ruinous palace of Bijapoor and the cemetery of the rajas of Cotoche; I did not remark any thing worthy of notice about the tombs or saw any inscriptions on them, but I am no antiquary, nor have I any partiality for antediluvian fragments or for pillaging vespertillian abodes. Roodur Chund, the Meer of Raj-ghirri, has a jaghir which produces him an annual income of about 35,000 Co.'s Rs. He is an old man possessing the usual amount, or rather deficiency of intellect, which most native princes rejoice in. His residence is not worthy of description, although it is prettily situated on the right bank of the river and in the Sunghole Dhoon.

53. The position of Shujanpoor Tira is difficult to describe. Any person reading the account of that place in the Gazetteer of the countries adjacent to the North-Western Provinces would imagine that it stands on a hill or some rising ground, whereas its situation is just the reverse, or down in a dell! It is built on the north-eastern half of a level plain some 5 or 600 acres in extent, lying on the left bank of the Beas, and enclosed on three sides by low, naked hills. The fourth or north-eastern front opens into that part of the Kangra valley which I have called the Sunghole Dhoon. It consequently enjoys a magnificent prospect of the Chumba range† and the low wooded hills in the rear of

* For this man's history vide Moorcroft's travels.

† The Chumba range, so often mentioned in this journal, is visible from the summit of Jacko at Simla, from N. 30° west to N. 70° E. Also from Koteghur, from N. 8° E. to N. 28° east.

Raj-ghirri, with Assa-pooree and others. The Beas flows in a wide channel about 100 feet below the plain, and escaping through the gap in the Chungur-ke-dhar enters the Joala valley near Nadoun. The town is large and populous, containing about 5000 inhabitants. In the centre is a large quadrangular space covered with turf, and called, I believe, a "chaugan." There Sansar Chund and his courtiers were in the habit of playing the game known as "hockey on horseback." The whole town is completely overgrown by trees, scarcely a single house being visible from a short distance. It covers but half of the plain. What a splendid parade ground the remainder would form! What a delightful situation for a Military station! the neglected portion of the plain would form a parade ground sufficiently large for three or four regiments, and the level summits of the surrounding heights would afford any localities for barracks and houses. The plain is elevated 2470 feet above the sea, and the climate is agreeable, snow occasionally falling during the winter, whilst hot winds, or sand storms rarely sweep over the place. The palae of Tira is in a dilapidated state, and is situated on the hills overlooking the town, and about 300 feet above it. On the same side to the eastward, but two miles distant, stands a fort which appeared to be going to decay, but I did not visit it. On the opposite side of the river to the north-east is the garden of Alempore, where our countryman Moorcroft was received by the Raja of Tira, and ex-Raja of Cotoch. Those pleasure grounds are now to be converted into a tea garden. The Government made over to the present representative of Sansar Chund the useless place without the garden of Alempore, thus depriving the gift of all appearance of disinterested generosity. I must here notice the custom of writing the names of adjacent towns, villages, or places of note whenever they are mentioned, thus the palae and town are always spoken of as Shujanpoor Tira; again the Bul Dhoon is called Sookeyt Mundi; also Kangra, Bhawun and Pallam Puttiar, &c. are commonly used.

54. We left Shujanpoor on the 4th February, having been delayed there by the weather, which had been very changeable. Sharp frosts were succeeded by snow, or sleet by torrents of rain, and violent gusts of wind, accompanied by thunder and lightning. How thrilling it is to behold the mountains when dark clouds are rolling along their steep flanks and the vivid lightning is playing on their peaks, and whilst the

loud thunder reverbrates against their sides the sound is re-echoed through every glen. But how different is the sensation when the tumultuous roar of the elements has been succeeded by death-like stillness, and we behold the distant summits covered with fresh snow standing out in bold relief against the deep azure of an eastern sky. We marched on the day above mentioned to a small village called Thoorul, situated about seven miles north of Tira. The road runs parallel to the Joala range and passes through corn fields and pretty hamlets. Between the hill called Assa-pooree and the ridge which separates the pergunnahs of Kangra and Pallam, the valley consists of an extensive plain, which slopes downwards from the Chumba range. It is intersected by several torrents which flow along the bases of deep ravines.

55. About nine miles further on in a north-eastward direction we came upon the flourishing village of Bhurwurnah, which is but five miles distant from the base of the Chumba range and near the centre of the pergunnah of Pallam. We encamped within a large plot of ground which was being laid out for the cultivation of the tea plant. The road all the way is excellent and passes through a most delightful country. The numerous villages are adorned with a profusion of mango and silk-cotton trees and copses of bamboo. The rippling brook and the hedgerow on either side, with stately trees overhanging the road, gave quite an English aspect to the scenery, the similarity of which was not a little increased by the occurrence of patches of snow in the shady hollows. I noticed that the boulders buried in the alluvial strata, and of which sections are visible on both sides of the road, were in every stage of decomposition or disintegration. Some of them were so far gone as scarcely to be distinguishable from the clay in which they are embedded. In many instances merely the outlines shewing the original size and shape of the boulders are left. They had been originally blocks of quartz, granite, sienite, sandstone and various kinds of schist. In the clayslate composing the hill called Jacko at Simla I remarked similar outlines within which were invariably materials of a different nature to the hard clay with which they were surrounded. They puzzled me greatly at the time, as I was then unable to account for their presence, but I now feel convinced that they also must originally have been boulders, and that they have been decomposed since their deposition in the strata. It seems almost impossible to account for them on any

other supposition. The streams which flow from the Chumba range appear to have cut their way through many feet of strata, leaving flat terraces at different levels and at corresponding heights on both banks. The surfaces of these terraces are not horizontal but parallel to those of the streams, or the general inclination of the valley. Their formation can only be accounted for by supposing a rising of the land to have taken place at intervals, whilst the work of denudation has been going on incessantly. The upheavals, whether gradual or sudden, must have been intermittent, and long pauses have occurred between each, during which the streams had sufficient time to encroach upon their banks. If the above hypothesis be not adopted we must have recourse to another, which is not supported by analogy. We must suppose that when those rivers first began to flow their volumes of water were much greater than they are at present, and that they were from time to time suddenly decreased until they became as small as they are, a supposition totally unsupported by any similar facts, whereas the phenomena of the elevations and subsidencies of land are going on at the present day.

56. Although Kangra was but 14 miles distant, we preferred making two marches of it, and therefore halted at a large village called Nagrota, about nine miles from Bhurwarnah. The road is good, and passes over some low rounded ridges of sandstone and marls. The country is exceedingly pretty, but the whole valley of Kangra is the same. At Nagrota another Government garden was being laid out for the reception of the tea plant: the one at Bhawan had been sown, and the seeds had germinated before I left the district, in the beginning of April last. From what has been said of the geology of this district, the nature of the soils in the several valleys may be easily surmised. In the first place the soil of the Jaswun Dhoon is sandy, with an admixture of clay, mica, and lime, the summits of the two enclosing ranges are also sandy, and mixed up with a large proportion of gravel. The soil of the Joala valley on the other hand is composed of a marly clay, having sand mixed with it in variable proportions. But that of the Kangra valley is the most fertile, and is made up of the debris of the rocks composing the Chumba range, viz. granite, clay-slate, sandstone and marls. During my rambles through the hills I noticed the following kinds of crops, some of which I have not mentioned before, viz. sugarcane, rice, cotton, barley, wheat, tobacco, poppy, linseed, turmeric, ginger, potatoes, sunn,

molee, bajra, hemp, and the castor oil plant, besides the following fruit trees—walnut, pear, apple, cherry, plaintain, mango, mulberry, apricot, various kinds of oranges and lemons, grapes and figs, as well as several species of the bair and the corinda (*carissa carandas*).

57. I am indebted to Captain A. Cunningham for the following elevations. They are to be taken as approximations, which may be 100 feet either more or less than the truth.

Adinanagur,	1200 feet.
Pathankot,	1200
Noorpoor,	1665
Kotila,.....	1370
Kangra,	2647
Joala Mukhi,	1805
Tira,.....	2470
Mundi,.....	2637
Sultanpoor,	4584
Hoshiarpoor,	1200
Kumleh-gurh,	4258
Nari Ghaut,.....	2009
Rajpoor ditto,	2500
Sekunder ditto,	5430
Jaintri ditto,	5632
Gogar Pass,.....	4900
Tiri ditto,.....	6484

The following particulars of two storms which occurred at Kangra in 1847, may not prove uninteresting. On the afternoon of the 24th January, the weather set in wet and continued so until the evening of the 29th. We had a smart fall of hail on the 27th, and a severe storm on the 29th. The annexed are the variations of one of Fahrenheit's thermometers observed during the storm. The thermometer was suspended three feet above the ground in an exposed position.

20 minutes before storm,	48°
Commencement,	43
Middle,	33
End,	33
$\frac{1}{4}$ an hour after,	38
1 hour after,	39
9 o'clock, P. M.,	37

It commenced at $\frac{1}{2}$ past 4 o'clock, P. M. and lasted $11\frac{1}{2}$ minutes. When the storm was directly overhead 3 and sometimes 2 seconds only elapsed between the lightning and the thunder. The hailstones were very large and looked like small balls of snow. The greater part remained on the ground a full hour after the clouds had cleared away. The clouds travelled from east to west. On the morning of the 30th at a quarter of an hour after sunrise the thermometer stood as low as 33° , and here and there were still to be seen masses of hailstones. On the morning of the 2nd of February, snow fell for two hours and 20 minutes. It covered the whole valley of Kangra as far as the Joala range. The thermometer stood on that day as follows:—

At $8\frac{1}{2}$	A. M.	(clouded and commenced snowing), . . .	36°
„ 9	„	still clouded,	35
„ 10	„	ditto ditto,	37
„ 11	„	a few minutes of sunshine,	38
„ $11\frac{1}{4}$	„	ceased snowing (clouded,)	39
„ 12	„	clouded,	41
„ 1	P. M.	ditto,	41
„ $1\frac{1}{2}$	„	ditto,	49
„ $2\frac{1}{2}$	„	ditto,	47
„ 3	„	ditto,	46
„ $3\frac{1}{2}$	„	ditto,	44
„ 4	„	ditto,	43
„ $5\frac{1}{2}$	„	ditto,	42
„ 6	„	ditto,	41
„ 7	„	ditto,	40
„ 8	„	ditto,	39

From the above it will be seen that the thermometer indicated a greater intensity of cold during the hailstorm.

Kangra is situated in latitude $31^{\circ} 57'$; Longitude $76^{\circ} 4'$ *

On the following morning an hour after sunrise my thermometer was standing at the freezing point! The ground was covered with hoar frost and the snowy range appeared in all its glory, free from clouds and mist, and glittering with ineffable brightness. No pen could have described the sublimity of the Chumba range as it then appeared clothed from head to foot with its chilly mantle.

* Vide Thornton's Gazetteer.

MISCELLANEOUS.

A Notice of a very remarkable local deviation of the Compass near Saugor in Bundelcund, communicated by Captain J. H. CAMPBELL, B. A.—By HENRY PIDDINGTON.

In November last I received from Captain J. H. Campbell, B. A. Commissary of Ordnance at Saugor in Bundelcund, a letter of which the following is an extract:—

“A friend of mine was lately surveying the line of road from this northward to Heerapore, when the following strange incident took place, and which I give you in his own words.

‘I send you the account of the magnetic attraction. I observed on the banks of a nullah close to the village of Sarraroo, $33\frac{1}{2}$ miles hence on the Nowgong road. The instrument I used was a Prismatic Surveying Compass, $3\frac{1}{2}$ inches in diameter, and the disk divided into twice 180° . I was surveying the road, and found on arriving at station “b” on the banks of a stony nullah, that the back bearing to station “a” was 165° , S. E.; thinking that this was an error I placed the instrument at station “a” and found the bearing of “b” to be 60° N. E. of a Peepul tree on the right of the road $71^\circ 40'$ N. E., and of the sun (which had risen about $\frac{1}{2}$ an hour) 105° S. E.; I then measured to the Peepul tree 68 yards, and planting the instrument there found the bearing, of station “b” 58° N. E., and of the sun $106^\circ 40'$ S. E. After this I returned to “b” and found the bearing to “a” 165° S. E., the Peepul Tree $163^\circ 30'$ S. E., and to the sun 35° N. E. I next passed 232 yards beyond station “b” and placing my compass in exact *alignement* with flags “a” and “b,” found the back bearing to “a” to be 60° S. W., thus proving that the forward bearing from “a” to “b” was perfectly correct, and that there must be some magnetic attraction at station “b.” On returning to “b” I found the forward bearing to “c” was 177° N. W., whereas at “c” the bearing of “b” was $72^\circ 30'$ S. W. This was on the 20th of October last month. On my returning on the 23d October, I tried many experiments, and found that the attraction was confined to the spot “b,” as 10 paces from it all round the needle was not affected.”

Such is this officer’s account of this strange occurrence. At his request I tried some experiments in the Magazine here, near piles of shot and shells, to see if iron alone could affect the needle to such a degree; I took one of the same sort of Prismatic Compasses which I have in store in the Magazine, and applied it in the same manner as the above officer did in his experiments, and on placing the instrument near a small pile of 6lb shot found the attraction to be 2° , and near a large pile of 24 pr. shot it was 6° , I tried this two or three times, but never

found it to exceed the latter. Thus apparently shewing that iron alone could hardly have been the cause of the attraction at 'Sarraroo.' I may as well mention that the above officer has been surveying for some years, and has had his compass in use for 5 years, and never found it play such tricks before. All that part of the country is famous for iron ore, and a great deal of it is smelted by the natives not very far from Sarraroo, though not at that place."

It was evident from this that at the station "b" a deviation of some 105° was occasioned by some hidden cause, and in reply to Captain Campbell, after quoting to him the well known instances of deviation occasioned by basaltic rocks, and that of Captain W. F. W. Owen in Canada, who found a difference of 5° to 22° in bearings taken on different sides of his own house,* I suggested that by digging at the spot a mass or vein of magnetic iron ore, or even a meteorite (of which I had some hopes I confess) might be found. In his reply to me in March last he states that they *had* dug and found at a depth of about 5 feet a highly magnetic stone in large masses, occupying a space of about 10 feet square, and in return for some specimens which he required from the Museum of Economic Geology for the public service, he was good enough to forward me a specimen of it by banghy, which is now exhibited to the meeting. Upon examination it proves to be simply a Diorite† with a strong admixture of magnetic iron ore, giving it distinct polarity, but yet not enabling it to attract even small filings; and with numbers of minute amygdaloidal semi-crystallised grains of the melanite variety of Garnet interspersed in its substance. Its coating is of the usual ferruginous earthy kind, seen on common iron ore and basalts; and Captain Campbell informs me that the earth about it was much of this kind; I suppose a ferruginous loam or gravel. He adds that none of the basalts found in the neighbourhood are magnetic, nor are there any rocks of this kind in the vicinity.

I have carefully examined it for Nickel and Chromium, but it affords no trace of them, and is thus purely and simply a highly magnetic Diorite.

But we have here the remarkable geological fact of a considerable boulder of a very remarkable rock buried in the alluvium (or diluvium) of probably a distant district, and discovered by a very singular hazard; and it may thus become of high interest, when its parent rock or vein shall be found, to trace the road by which it must have travelled to its present position; for the rock is sufficiently remarkable not to be passed over even as a mere geological specimen, independent of its extraordinary magnetic powers, and I have thus deemed it well worthy of permanent record.

* Naut. Mag. 1840, p. 293.

† A mineral composed of Felspar and Hornblende.

Further remarks on the Ball Coal of the Burdwan mines. By HENRY
PIDDINGTON, Curator Museum of Economic Geology.

Mr. Homfray having at my request furnished us with a block of the coal from the seams of which the ball coal is taken, I have examined it very carefully and the following are my results.

Description.

The block of coal averages about 10 inches by 9, and is somewhat more than 6 inches thick, so that it may be, in round numbers, about the third of a cubic foot.

At the top and bottom of the seam the block has the usual soft, velvet-like coating of carbonaceous matter, with traces of fossil plants, so frequently found upon the seam sides of coal of all kinds, and in which impressions, more or less distinct, of vegetable forms are usually seen. The cross fracture however is difficult to describe. It is on one face tolerably vertical and perpendicular to the planes of the upper and under surfaces, like a block of English coal, but in the direction of the layers of alternate bright and dull coal of which it is composed, it is wavy, though not very deeply so. But upon the other three faces its structure and fracture can only be described by calling it a sort of flattened, globular concretionary one, having much the appearance of many softened globula, masses of coal pressed into flattened layers amongst layers of common coal, and where a lump is detached it assumes an irregularly elongated form, globular or bulging at the ends and sides, and flat above and below; appearing as if, when free from pressure, it had been of the rounded form of the balls of coal, and yet (and it is this which constitutes the difficulty of imagining any hypothesis to account for this kind of structure), the horizontal layers of dull and bright coal run through the globular and conchoidal projections and hollows of the compressed balls, as regularly as through the simply stratified or foliated parts. The only thing indeed one can liken it to geologically, would be a mass of gneiss just decomposing and separating into irregularly shaped globular or ovoidal concretions, as granite does into spherical ones, but preserving its stratification.* We have one concretion detached from the mass about 4 ins. by $2\frac{1}{2}$ and $1\frac{1}{2}$ thick which is very distinctly a flattened and elongated ball, and it has left a hollow mould in the large mass where imbedded, yet it is distinctly formed of

* Boase (*Primary Geology*, p. 114,) describes various kinds of conglomerated rock and of mica amongst others, but the nuclei of his instances are all different from the enveloping mass, but our balls are perfectly identical with it!

one large layer of bright coal and a number of dull ones with minute bright folia amongst them on both sides of the bright layer.

Examination.

The sp. gravity of a carefully chosen piece with part of a globular concretion attached is,

1. 26

It contains in 100 parts ; Hygrometric Water,

3. 90

Gaseous matter,

18. 90

Carbon,.....

61. 75

Ash,

16. 25

100. 80.

It will be seen that this makes it an inferior coal to the ball coal formerly analysed, but this is of little consequence, since it is not the quality of the coal, but its singular structure, which we are now investigating. I have been informed by Captain Powell of the P. and Or. Company's service, that in a steamer in which the coals were found to be on fire, but were extinguished, that the whole of the heated mass (of English Coal) was more or less softened, so that they were obliged rather to cut it like soft clay, so as to dig it out for throwing over-board ! If this was the effect of heating under the light pressure of a steamer's coal-bunker, we may readily suppose that a whole bed of coal may, when heated under the pressure in the mine, so far soften as upon gradual cooling to be at liberty to affect this semi-concretionary form, as so many half liquified bodies do, and as we see is shewn to be in granites and traps, when they decompose, their tendency also. But as we do not yet know how far this structure of the coal extends, and how it passes into the common laminary form and cubical fracture, we must suspend our judgment and our speculations as to what can have really given rise to this singular variety of coal. At present the few specimens we possess do not allow me to sacrifice any of the complete little shining nodules which may have an homogeneous structure, for examination.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL
FOR APRIL, 1849.

The usual monthly meeting of the Asiatic Society was held at the Museum on Wednesday, the 4th April, 1849.

The HON'BLE SIR JAMES COLVILLE, President in the chair.

The proceedings of the March meeting were read, and the accounts and vouchers of the preceding month laid upon the table.

Letters were read from the following gentlemen, intimating their desire of withdrawing from the Society :—

W. GREY, Esq. C. S.

J. J. MACKENZIE, Esq.

J. KERR, Esq.

A. CHRISTOPHER, Esq.

DR. McRAE, a candidate for election at the April meeting, was proposed by Dr. Roer, seconded by Mr. Laidlay.

MR. WATTENBACH having returned from Europe and signified his wish to rejoin the Society, his name was restored to the list of members.

Read a letter from R. Thornton, Esq. Secretary to the Government of the N. W. P. conveying His Honor the Lieut. Governor's acknowledgments of the 200 extra copies of Lieut. Maisey's Antiquities of Kalingar, forwarded to him by the Society.

From W. Seton Karr, Esq. Under Secretary to the Government of Bengal, presenting for the use of the Museum of Economic Geology, a plan of the Fort of Monghyr, and of the lands adjacent to it.

From W. Grey, Esq. Under Secretary to the Government of India, conveying the thanks of the Hon'ble the President in Council for the copies of the map of the localities recently occupied by the British and Sikh armies, presented by the Society to the Court of Directors.

From Captain Newbold, forwarding a note on the strata cut through in excavating for coal in Wadi Sheraiet, by Hekekyan Bey.

From the Rev. Mr. Pratt, an additional note on the subject of Iron Tension Bridges, containing a reply to certain remarks upon his former paper by Major Goodwyn.

From Major Anderson, forwarding a memoir on the Geography of Western Affghanistan.

Read extracts from an interesting private letter from Captain Kittoe, detailing the progress of his present Archeological researches on the banks of the Gandak, and forwarding a beautiful and spirited sketch of the capital of the column at Mattia, surmounted by a lion.

From Captain Thuillier, the Meteorological Register for the month of March.

From Dr. Roer, the subjoined letter containing sundry propositions of the Oriental Section, which were approved and adopted by the Society.

To DR. W. B. O'SHAUGHNESSY, *Senior Secretary, Asiatic Society, Bengal.*

Dated Asiatic Society, the 5th March, 1849.

SIR,—I have the honour to submit to you, for the approval of the Council and Society, the subjoined propositions of the Oriental Section with regard to the works next to be printed in the BIBLIOTHECA INDICA.

Extract from a letter from G. H. BUSHBY, Esq., Secretary to Government of India, to DR. W. B. O'SHAUGHNESSY, Senior Secretary, Asiatic Society, No. 685, dated the 29th July, 1848:—

3. With reference to the employment of their grant in the publication of the Vedas, you will be pleased to inform the Society, that the Honourable Court have sanctioned the printing of the Rig Veda in England. It will therefore not be necessary to undertake the publication of that work in Calcutta. *There are, however, other Vedas or portions of them, which it is desirable to preserve through the means of the press, and which may very properly become the objects of the Society's attention.*

2. The *Sanhitá* and *Brámhāna* of the black Yajur, accompanied with the commentary, being very extensive, the publication of the work, if undertaken by one individual, would be much delayed. *The Section therefore would recommend*

To entrust this work to two Editors, and to publish the *Sanhitá* and the *Brámhāna* at the same time, so as to print two numbers of the Journal every month. Bābū Rājendra has offered to undertake the edition of the *Brámhāna*, while the Secretary is willing to publish the *Sanhitá*.

3. As the edition of the *Brihad Aranyaka Upanishad* is nearly finished, and the *Kadamvari*, which, at the recommendation of the Section, the Society had resolved to print, has since been prepared for the press by a Pundit in Calcutta;

1. With reference to the paragraph in the margin, from G. H. Bushby, Esq. Secretary to the Government of India, to the Senior Secretary, by which the co-operation of the Society in the publication of the Vedas is requested, the Section beg to purpose—

To collect, with the least practicable delay, MSS. of the text of the *Taittareya*, or Black Yajur Veda, and of Sāyana Acharya's Commentary to the same, with a view of its early publication, editions of all the other Vedas, with the exception perhaps of the *Atharva*, being prepared in Europe.

further, as the collection and collation of the MSS. of the Black Yajur cannot be completed in a time short of a year; and lastly, as the two works at present in the course of publication (viz. Dr. Sprenger's Arabic work, and the Kāmanduki Niti Śāstra) will not fill more than two numbers of the Journal, *the Section propose* the following works to be printed in the meantime:—

1. The Chandogya Upanishad, with the commentary of Mādhava Ācharya, and Tika of Ānanda Giri (not published before.)

2. The Shiksha, one of the Vedāngas, with the commentary of Mādhava Ācharya. (There is a beautiful MS. of this work in the Library of the Society).

4. In consideration, that it is impossible for one individual to publish and at the same time to translate such voluminous works as those recommended for edition, and yet that a translation of them is of the highest importance for the usefulness of the Journal, *the Section beg to suggest*—

That the Society should offer for the translation of any work published in the Journal, a remuneration of Co.'s Rs. 1-8 per page, provided of course that the rendering has met with the approval of the Section.

I have the honour to be, Sir,

Your most Obedient Servant,

E. ROER,

Secretary Oriental Section Asiatic Society.

From the same, recommending, on the part of the Oriental Section, the purchase of some copies of Captain Latter's Burmese Grammar for distribution among the learned bodies with whom the Asiatic Society is in correspondence. The consideration of this subject was postponed to the May meeting.

From the Rev. Mr. Long, proposing a more active intercourse with the Orientalists of Holland.

A fine collection of copper ores from the mines of Burra burra, just received by Mr. Laidlay from Mr. Andrew Berry of Adelaide, as exhibited and presented to the Museum of Economic Geology.

For all the above communications and donations the thanks of the Society were voted, and the meeting adjourned.

J. W. COLVILLE, *President*.

J. W. LAIDLAY, *Secretary*.

LIBRARY.

The following books have been received since the last meeting:—

Presented.

Sārdakalpadruma, Vol. VI.—By RA'JA' RA'DHA'KANTA DEVA.

Bibliographical Index to the Historians of Muhammadan India.—By H. M. Elliot, Esq. C. S. Vol. I. Calcutta, 1849, 8vo.—By THE AUTHOR.

Catalogus Collegii Harvardiani seu Universitatis Cantabrigiæ, in Republica Massachusettensi. Cantabrigiæ: 1848.—By WILLIAM THADEUS HARRIS, Esq.

A Catalogue of the Officers and Students of the University at Cambridge for the Academical year 1847-48.—BY THE SAME.

A Catalogue of the Students of Law in Harvard University, 1848.—BY THE SAME.

The Oriental Baptist, No. 28.—BY THE EDITOR.

The Upadesaka, No. 28.—BY THE EDITOR.

The Calcutta Christian Observer, for April, 1849.—BY THE EDITORS.

Tatwabodhini Patricā, No. 68.—BY THE 'TATWABODHINI' SABHA'.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of February, 1849.—BY THE DEPUTY SURVEYOR GENERAL.

The Oriental Christian Spectator, for January and February, 1849.—BY THE EDITOR.

Journal of the Indian Archipelago, Vol. III. No. 2nd.—BY THE EDITOR.

Ditto ditto, (2 copies.)—BY THE GOVERNMENT OF BENGAL.

Purchased.

Comptes Rendus, Hebdomadaires des Seances de l'Academie des Sciences, Tome XXVII. Nos. 19—24.

Journal des Savants, Novembre, 1848.

The Annals and Magazine of Natural History, Nos. XII. XIII. N. S.

The Edinburgh Review, No. CLXXIX.

Exchanged.

The Athenæum, Nos. 1104—507.

Dur-ul-Muktar. On Muhammadan Law, 1 vol. 4to.

Tysir-ul-Osul. Ditto, 1 vol. 4to.

Risas-ul-Ambia. History of Muhammad, 1 vol. 4to.

Mekamat Hariri. On Rhetoric, 8vo.

Mohit Zwavete Dewāni. A Persian version of Marshman's "Civil Guide." 4to.

Bahar-ul-Jowahir. Dictionary of Medical terms, 4to.

Sharch Asbab. On Medicine, 4to.

Akhlaq Hindi. Persian Translation of the Hitopodesha, 8vo.

Ujūzah. On Medicine, 8vo.

Tafsir Ahmody. A dissertation on Religion, 4to.

Ajal Ajab. On Rhetoric, 8vo.

Masnavi-e-Gulzār. A Poetical version of the Romance entitled Gulebakawali.

Lucknow, 8vo : (lithographed.)

Tib-e-Nab-wi. A medical work containing prescriptions recommended by Muhamed. Lucknow, 8vo.

Sahrir-ush-Shahādatain. Chronicles of the Imams, Lucknow, 1847, 8vo.

Sir-ush-Shahādatain. Ditto, 8vo.

Fawāed-e-Samdiā. Persian Grammar, 8vo.

Hakikat-ul-Islam. A treatise on the moral and religious duties of the faithful, 8vo.

Saukiat-e-Kisrān. On Letter Writing, 8vo.

Naho Mir. Persian Syntax, 8vo.

Sāhifā Shāhi. On Letter Writing, 8vo.

Mozhab-e-Eshk. A Romance, 8vo.

Sharch Miat. Rules of Grammar, 8vo.

Rauzat-ul-Ahkām. On Muhammadan Law, 8vo.

Fawāed-ul-Awām. History of the Prophets, 8vo.

Gaet-ul-Bayān. Persian Grammar, 8vo.

Tozhiz Takhfīm. On Muhammadan Ceremonies, 8vo.

Dewān Atash-e-Khaud. A Collection of Odes by Atesh, 8vo.

Sharch Mohemmani. On religious duties, 8vo.

- Tekáhe Akbár. On Law, 8vo.
 Masnavi-i-Mir Hassan. A Poem, 8vo.
 Gulestán Mahusá. Gulestán with Commentary, 8vo.
 Bostan Mahusá. Bostan with ditto, 8vo.
 Majmu-us-Sanáni. A Collection of Letters, 8vo.
 Kissa-e-Bahrám Gó. The History of Bahrám Gó. A Poem, 8vo.
 Déwan Gáni. A Collection of Odes by Gáni, 8vo.
 Rukká-át Lakshmináráyan. The Letters of Lakshmináráyana, 8vo.
 Insha-e-Fuez Rasán. On Letter Writing, 8vo.
 Rukká-át Mirza Be-dil. The Letters of Mirza Be-dil, 8vo.
 Mehar-ul-Fasáhat. A Collection of Letters of Fasul-Akbári. On Law, 8vo.
 Chahar Shariet. Select Rules on Letter Writing.

Report of the Curator Museum of Economic Geology for the month of April.

Geology and Mineralogy.—I have put into the form of a notice for the Journal the account of a very remarkable instance of an apparently isolated boulder of a highly magnetic Diorite which was discovered to be buried in the earth, at a surveying station near Saugor, Bundelcund, by an extraordinary deviation of the Compass. It is to Captain J. H. Campbell, B. A. Commissary of Ordnance, Saugor, that we are indebted for the information which first led to this discovery, and for the specimen of the mineral now exhibited.

Mr. J. Weaver has sent us a remarkably fine specimen of a shell conglomerate from Junk Ceylon Island.

Museum of Economic Geology.—Mr. J. Homfray has at my request sent us a specimen of the coal from the mine in which the Ball Coal is found, which upon examination proves to be itself a mass half composed of compressed yet regularly stratified balls, or something very like it. I have put into a paper for the Journal my examination of this coal, and trust soon to obtain a sufficient supply of the large and small balls for comparative experiment.

H. PIDDINGTON.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of April, 1849.

Lat. 22° 33' 28". 33 N. Long. 88° 23' 42". 84 East. Mag. Variation 2° 28' 36" East. Mag. Dip. 27° 45'.

Days of the Month.	Observations made at sunrise.					Maximum Pressure observed at 9h. 50m.					Observations made at apparent noon.					Observations made at 2h. 40m.					Minimum Pressure observed at 4 p. m.					Observations made at sunset.					Maximum and Minimum Thermometer.			Rain Gauges.		Days of the month.	
	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Aspect of the Sky.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Aspect of the Sky.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Aspect of the Sky.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Aspect of the Sky.	Maximum.	Mean.	Minimum.	Maximum Thermometer to sun's rays.	Elevations.								
		Of the Mercury.	Of the Air.	Of Wet Bulb.				Of the Mercury.	Of the Air.	Of Wet Bulb.				Of the Mercury.	Of the Air.	Of Wet Bulb.				Of the Mercury.	Of the Air.	Of Wet Bulb.							Of the Mercury.	Of the Air.	Of Wet Bulb.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Of the Mercury.		Of the Air.
1	29.616	78.9	79.9	75.3	S. W.	Cloudy.	29.629	81.3	81.9	78.2	S. W.	Clear.	29.611	97.9	97.0	73.0	W. N. W.	Clear.	29.621	98.2	96.2	71.7	W. N. W.	Clear.	29.621	98.0	91.7	73.6	S. E.	Clear.	29.621	98.0	79.6	119.1	..	..	1
2	29.616	78.8	79.3	75.3	L.	Cloudy.	29.623	80.8	81.0	79.3	S.	Cloudy strati.	29.611	95.2	93.3	80.0	N. N. E.	Cloudy strati.	29.621	95.2	93.4	80.4	S. S. E.	Cloudy strati.	29.621	95.1	88.2	73.9	S.	Cloudy.	29.621	95.1	88.2	73.9	..	..	2
3	29.625	78.5	78.6	77.2	E. S. E.	Clear.	29.634	88.0	86.2	79.0	S.	Clear.	29.611	91.7	92.3	74.6	S. S. W.	Clear.	29.621	91.4	90.0	78.0	S. S. W.	Cloudy.	29.621	91.4	90.0	78.0	S.	Cloudy.	29.621	91.4	90.0	78.0	..	..	3
4	29.625	78.0	78.8	75.3	S. E.	Clear.	29.634	81.0	82.0	72.1	N. E.	Clear.	29.625	92.8	92.0	76.3	S.	Clear.	29.625	92.8	92.0	76.3	S.	Clear.	29.625	92.8	92.0	76.3	S.	Clear.	29.625	92.8	92.0	76.3	..	..	4
5	29.625	75.2	75.4	73.9	S. E.	Cloudy.	29.625	85.3	84.0	77.0	S. S. W.	Cloudy strati.	29.625	90.1	90.0	77.1	S. W.	Cloudy strati.	29.625	90.1	90.0	77.1	S. W.	Cloudy strati.	29.625	90.1	90.0	77.1	S.	Cloudy.	29.625	90.1	90.0	77.1	..	..	5
6	29.625	75.0	75.7	74.0	S. S. E.	Cloudy.	29.625	85.3	84.0	77.0	S. S. W.	Cloudy strati.	29.625	90.1	90.0	77.1	S. W.	Cloudy strati.	29.625	90.1	90.0	77.1	S. W.	Cloudy strati.	29.625	90.1	90.0	77.1	S.	Cloudy.	29.625	90.1	90.0	77.1	..	..	6
7	29.625	76.6	76.9	73.5	S. E.	Cloudy.	29.625	87.3	87.3	79.8	S. sharp.	Cloudy strati.	29.625	91.5	91.3	81.2	S. sharp.	Clear.	29.625	91.5	91.3	81.2	S. sharp.	Clear.	29.625	91.5	91.3	81.2	S.	Clear.	29.625	91.5	91.3	81.2	..	..	7
8	29.625	79.6	80.4	78.0	S. E.	Clear.	29.634	91.2	90.4	82.3	S. S. W.	Clear.	29.634	95.8	94.8	82.3	S. sharp.	Clear.	29.634	95.8	94.8	82.3	S. sharp.	Clear.	29.634	95.8	94.8	82.3	S.	Clear.	29.634	95.8	94.8	82.3	..	..	8
9	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	9
10	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	10
11	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	11
12	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	12
13	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	13
14	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	14
15	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	15
16	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	16
17	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	17
18	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	18
19	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	19
20	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	20
21	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	21
22	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	22
23	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	23
24	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	24
25	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	25
26	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	26
27	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	27
28	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	28
29	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S. sharp.	Clear.	29.625	91.2	91.3	81.2	S.	Clear.	29.625	91.2	91.3	81.2	..	..	29
30	29.625	78.0	78.3	77.3	S.	Clear.	29.625	91.2	90.4	82.3	S. S. W.																										

These Observations have been made for the most part, with a supply of new and first rate Instruments received into the Observatory, by order of the Bengal Government, a brief description of the Instruments seems necessary.

1st.—The Barometer is a standard Instrument by Newmann, diameter of the tube 0.504 inches. The following is the comparative showing of this Instrument and those Barometers which were in use at the Observatory prior to 1st of June, 1844.

Barometer by Troughton used prior to the 1st of June, 1844. Observations reduced to 32° Fahrenheit. 29.493
 Ditto, Ditto Col. Everest used from 1st of June to 31st of August, 1841. 29.637
 No. 52 Standard Barometer by Newmann used from 1st of September, 1841. 29.651
 No. 85. Ditto. Ditto. from 3d of April, 1847. 29.667

2nd.—The Thermometer is a Standard Instrument by Newmann, on metal Scale and graduated to 1/4 of a degree.

For use in Library only

